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ORIENTATION OF CANADIAN AGRICULTURE

A TASK FORCE REPORT

*Summary
and
Conclusions*

Volume IV

1977





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CANADA DEPARTMENT
OF AGRICULTURE

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ORIENTATION OF CANADIAN AGRICULTURE

FOREWORD

The Task Force on the Orientation of Canadian Agriculture was set up by the Senior Management Committee of Agriculture Canada with the following terms of reference: to describe Canadian agriculture and its evolution since 1950; to examine federal agricultural policies and programs in relation to national objectives.

Members of the Steering Committee were: B.B. Migicovsky, Chairman; D.G. Hamilton; M.J. Heney; A.E. Hannah; J.E. McGowan; and G.I. Trant.

Members of the Task Force were: W.S. Ferguson and W.J. Anderson, Co-Chairmen; C.J. Bishop; C.D. Caldwell; A.S. Johnson; and W.H. Leggett.

The Steering Committee and the Task Force wish to pay special tribute to the contribution of Dr. W.S. Ferguson whose untimely death occurred part way through the process of preparation of these reports. Dr. Ferguson served as Co-Chairman of the Task Force and made a major contribution both to the background philosophy and organization of the study. In particular, the review of the agricultural resources of the country and the production potential from their efficient use attracted his attention. The sections on these topics reflect many of his ideas. As they were still unfinished at the time of his death, others have had to carry them forward, but his competent leadership in these areas remains evident. Dr. Ferguson was keenly interested in the whole project and its implications for future planning of the industry, and his sincere dedication to the development and preparation of the reports is gratefully acknowledged.

Volume I of the report contains 21 chapters which describe Canadian agriculture and changes that have taken place since 1950. Chapters 1 to 9 cover production and market structure, resources, input supply systems, institutional services and domestic food utilization. The material in chapters 10 to 21 is concerned with commodity groups; these chapters, therefore, contain a more detailed description of the situation with respect to livestock and crops.

Volume II contains an analysis of the goals, programs, instruments and performance indicators of Canadian agricultural policy.

Volume III includes five sections which examine:

- (1) broad scenarios of the future demand for and supply of Canadian agricultural products;
- (2) the case for maximizing agricultural production;
- (3) instability in Canadian agriculture;
- (4) a family-farm oriented agriculture; and
- (5) various economic instruments which have been used or proposed to manage agricultural supply and demand.

Volume IV has been written for Senior Management. It contains summaries of Volumes I, II and III and the conclusions of the Task Force.

The authors of the papers in Volumes I, II and III are listed in each Volume. With the exception of (5) Volume III, the papers were prepared by officials of Agriculture Canada. Ms. Lucie Larose edited all the manuscripts, supervised the final typing and preparation of the charts and made the arrangements for printing. These tasks involved many hours of painstaking work, which the Steering Committee and Task Force gratefully acknowledge. Special thanks are also due to Dr. W. Pigden for his help and advice in preparing the papers on animal products and the supply scenarios.

ORIENTATION OF CANADIAN AGRICULTURE

BACKGROUND

Social and Political

An adequate and dependable food supply is among the most basic of human needs. However, Canadians have had little to be concerned about the adequacy of food supply. Agricultural policy has emphasized the development of technology and resources to provide exportable surpluses and this has resulted in a net positive balance in Canada's food trade account and a supply of food that has always been cheap relative to consumers' incomes.

In spite of the rise in food prices two years ago, the situation with respect to adequacy of food and its cost relative to consumers' incomes changed very little. Nevertheless, Canadians have shown an increasing awareness of agriculture and food supply systems. The reasons for the heightened interest in matters pertaining to food include:

- the sharp increase in grain prices during the mid-seventies;
- publicity about possible changes in climatological patterns;
- improved communication systems which have increased public awareness of the inadequacy of the food supply in many parts of the world;
- crises in other resource industries and increased environmental consciousness which have induced many to question the assumption that production increases from a finite resource base can continue;
- increasing emphasis on nutrition and food quality as factors in health and preventative medicine;

- spiraling inflation and public action to attempt to control prices;
- growing producer concern over buyer concentration in the market and conversely consumer concern over public and private attempts to increase producer bargaining power;
- increasing urbanization of Canadian society and the many ramifications of this process such as: greater use of convenience foods and dining out, social concern for the family structure, greater consciousness of disparities in living conditions.

As a result, many groups and individuals in Canada have become interested in food policy because of the uncertainties which they feel exist.

Statements emanating from various sectors of Canadian society indicate that the reasons cited above are given widely different weights by various groups and individuals. Some emphasize the issue of global food supply and are dedicated to the cause of increasing production to the maximum so as to contribute as much as possible to the elimination of malnutrition in the world. This viewpoint holds that adequate nutrition is a basic human right, the fulfillment of which should not be controlled by normal market forces. At the other extreme are those who believe that food production is a purely economic activity and that there should be little or no interference with supply or demand in the marketplace. Ranged between these polar positions is a spectrum of opinion with advocates of various kinds of supply and demand management, which would favor either domestic consumers or producers, depending largely on the values or interests of the individual or group. Overlaid on this spectrum are social concerns for the continuing viability of rural communities and the maintenance of the family farm as a social institution.

Economic

The production of food and fibre involves the functioning of many economically interdependent business organizations which employ various mixes of labour, materials, capital and technology, and are engaged in activities which include farming, supplying factor inputs, processing, marketing and retailing. Because Canada's climate and resources favor the production of some commodities much more than others, international trade in agricultural products is a large component of the food system. Food exports contribute substantially to the balance of payments and the revenue from exports is particularly significant to the economy of Western Canada. Imported products, which supply consumers with those foods which cannot be produced economically in Canada, are a substantial item in the national food budget.

In 1976, the gross income of Canadian farmers amounted to \$11.3 billion. In the production process, farmers utilized a capital stock (land, buildings, machinery and livestock) valued at \$48.8 billion, and purchased inputs in the amount of \$6.2 billion. There were 339 thousand farm holdings which occupied a farm land area of 67 million hectares and employed 474 thousand persons. At the other end of the system, consumers purchased food and non-alcoholic beverages in the amount of \$22.5 billion, agricultural exports brought in revenue of \$4.1 billion, and \$3.3 billion was paid for food imports (Appendix Figure 1).

In 1951, the farm labor force numbered 939 thousand persons which represented 18 percent of the total employed Canadian labor force; by 1976, the farm labor force represented 5 percent of the total. Since 1966, the size of the farm labor force has been declining by a yearly average rate of 1.3 percent.

Throughout the period since 1951, farm output has been increasing in spite of the declining size of the labor force. This growth has been achieved in large measure by substituting capital for manpower. Purchased inputs other than land and labor grew from about 38 percent of total farm inputs in 1961, to over 50 percent in recent years. During the 1971-76 period, farmers' expenditures on machinery and equipment, livestock, seed and nursery stock, feed and fertilizer increased at the rate of 15, 10, 23, 18 and 26 percent per year, respectively. In 1976, Canadian farmers spent \$1.4 billion on farm machinery, \$485 million on fertilizer and \$1.2 billion on feed. In that year, the total value of farm capital in Canada was estimated to be about \$163 thousand per farm; taxes on farm land and buildings totaled \$227 million.

The fact that agricultural output in Canada has been increasing by using an ever-smaller labor force, has contributed significantly to the growth of national labor productivity. For all industries in Canada, the average annual change in labor productivity from 1946 to 1974 has been 4.2 percent. Among the four broad industrial groups, i.e., agriculture, manufacturing, commercial goods producing (excluding agriculture and manufacturing), and commercial service-producing, the average annual change in labor productivity in agriculture has been the highest at 5.5 percent.

Agriculture also affects significantly other sectors of the Canadian economy. In transportation, about 14 percent of total freight is comprised of farm products, and approximately 38 percent of the tonnage moved through the St. Lawrence Seaway in 1976 was agricultural commodities. Farm expenditures on fuel and lubricants amount to about 17 percent of the total sales of motor fuels. In wholesale trade, almost 25 percent of the employment is associated with the sales of farm and food products or farm supplies.

Wheat and wheat flour represented over one-half of Canadian agricultural exports which totalled \$4.1 billion in 1976 and were 11 percent of total merchandise exports. (Appendix Figure 2). In 1951, agricultural exports of \$1.0 billion were 26 percent of Canada's total international merchandise exports. Since 1951, exports of farm products have always exceeded the value of agricultural imports which, in 1976, were \$3.3 billion or 9 percent of total merchandise imports.

In 1955, agriculture contributed approximately 7 percent of the Gross Domestic Product and ranked fifth among fifteen industries; in 1975, agriculture contributed 4 percent and ranked tenth. Among the five primary industries, agriculture ranked first in 1955 and second in 1975 (see table).

GROSS DOMESTIC PRODUCT OF FIVE PRIMARY INDUSTRIES,
CANADA, 1955 AND 1975

Industry	1955		1975	
	\$000,000	% of total	\$000,000	% of total
Agriculture	1,767	43.9	5,929	39.0
Forestry	438	10.9	1,035	6.8
Fisheries & Trapping	85	2.1	190	1.3
Mining	1,071	26.6	6,227	41.0
Utilities	664	16.5	1,813	11.9
Total	4,025	100.0	15,194	100.0

Source: Statistics Canada, Cat. 13-201.

In 1951, gross fixed capital formation in agriculture was about \$0.5 billion which was 13 percent of the total new capital formation in the economy; in 1975, the corresponding amounts were \$2.5 billion and 8 percent.

FACTORS

Canadian Agriculture in the World Setting 1975

About 1,473 million hectares or 11 percent of the world's land area are under cultivation and it is estimated that as much potentially arable land exists as is presently under cultivation. The ratio of agricultural land to population is 0.6 hectare per person in the developed countries, and 0.3 hectare in the developing countries.

World population has been growing at an annual rate of about 2 percent and now stands at approximately 4 billion persons. In the developing countries, about 65 percent of the population is engaged in agriculture compared with 12 percent in the developed countries. World food production is increasing faster than population, but because of the much faster population growth in the developing countries, the increase in available food on a per-capita basis in these countries is very small.

In the early 1970's, per-capita food production in the developing countries was little more than one quarter of that in the developed countries. The latter account for about 30 percent of the world population yet produce approximately 60 percent of the world's food. The average diet of the population in the developing countries is below nutritional requirements while the supply of food energy available to populations in the developed countries is about 20 percent above requirements.

Over the past two decades, the volume and value of world agricultural trade increased significantly. Nonetheless, total trade and aid in agricultural products currently account for only one tenth of the food produced in the world and trade is mostly concentrated in a relatively few commodities.

Over two-thirds of the world trade is between the developed countries and a large part of the food imports of the developing countries consists of cereals shipped as food aid. Many former cereal exporters have become net importers, while the United States, Canada, Australia and Argentine have emerged as the main cereal exporters.

Canada's population, arable land, food production and agricultural trade in relation to world totals are small, but Canada's share of the world's grain and oilseed exports is quite significant, being 20 percent for wheat and barley, 60 percent for rapeseed and 80 percent for flaxseed. Between 30 and 35 percent of Canada's agricultural production is exported and in the case of wheat the amount is 70 to 75 percent. The leading export markets for Canadian commodities are Japan, the European Economic Community, the United States, the Soviet Union and China. Between 1965 and 1974, the value of Canadian agricultural exports increased by 140 percent but those to the developed countries increased by 85 percent and to the developing countries by 370 percent. The result was that exports to the developing countries, which were 19 percent of Canadian agricultural exports in 1965, amounted to 37 percent in 1974.

Instability in world agricultural markets is primarily the result of climatic variations which affect supply, and of changes in the economic and trade policies of the major countries. The problems of instability may be aggravated in the future if the tendency to seek greater self-sufficiency and protection by many countries continues. Improved global information systems, medium-term contracts and multilateral commodity agreements have been proposed as instruments for stabilizing agricultural trade, prices and incomes.

Canada supports agricultural development assistance programs in many parts of the world, and at present is the largest per-capita donor of food aid of any country. During the past decade, Canada's expenditure on the food aid program amounted to \$1.2 billion and is increasing. In addition, Canada supports agricultural development assistance programs in many countries of the world, as well as at several of the international agricultural research centres. These activities include research in dryland farming, water resource evaluation, the development of wheat farming, the provision of fertilizers, and the development of storage facilities. Over 200 such projects have been undertaken.

The Natural Resource Base

Agricultural land has been classified in the Canada Land Inventory (CLI) on the basis of soil capability on a scale of 1-6, and of climatic capability on a scale of A-E (Appendix Figure 3). On this basis, 0.6 percent of the agricultural land is classed as A1 and almost 90 percent is located in climate zones D and E. Another important outcome of this classification is that approximately 55 percent of the land is rated marginal or unsuited for cultivated agriculture (classes 4 to 6) and, consequently, best suited to ruminant livestock production. The current use of agricultural land reflects this rating, approximately 50 percent of the land area being used for forage production and 45 percent for cereal crops these are the least demanding of any agricultural crops in terms of quality of land and climate.

Canada has 129 million hectares of land with some capability for agriculture and 49 million hectares of good land (CLI classes 1 to 3). Sixty-nine million hectares of land (1971) were within the boundaries of farms of which

44 million were cultivated. Seventy-nine percent of the farmland area is located in the Prairie Provinces. Recent trends show a gradual expansion of land in farming in the western provinces and a gradual reduction in the east.

A wide range of climates exists over the agricultural regions of Canada but, because of the distribution and limited availability of moisture and heat, all Canadian climates are generally unfavourable for agricultural production in comparison with those of the world's major food producing areas. Frost-free periods vary from 90-120 days in the prairies, to 160 days along the shores of Lake Ontario and Lake Erie, to a maximum of 220 days in the coastal areas of southern British Columbia. Precipitation during the growing season exceeds 500 mm in the Maritime Provinces, is slightly less in the warmer and humid areas of southern Ontario, averages between 200 and 350 mm in the prairies, and is as low as 100 mm in the hot arid inter-mountain valleys of the interior of southern British Columbia. Supplemental irrigation is used on only about 10 percent of all improved agricultural land. A potential of four to five times this amount of irrigation appears to be feasible.

The Structure of Canadian Farms

The number of farms in Canada, using the 1976 Census definition of those which had sales of \$1200 or greater, decreased by 23 percent from 387,072 in 1951 to 300,118 in 1976. Ninety-two percent of the farms in Canada are privately operated and organized as single proprietorships; six percent are organized as partnerships and two percent as corporations. Of the latter, most

are family farm corporations. Many of the most successful farms are organized as either partnerships or family farm corporations, and indications are that these forms of organization are expanding in numbers as well as in average size. Most farms in Canada are fully owned by the operators, but between 1951 and 1971 the proportion of farmers who owned all the land they farmed declined from 77 to 69 percent; in 1971, 5 percent of farm operators rented all the land and the remaining 26 percent were part-owners and part-renters. Farmers traditionally have maintained a high level of equity in their businesses. In spite of the fact that the amount of borrowed capital per farm and the proportion of farmers using credit have increased steadily in the last two decades, farmers' equity in their farms averaged 82 percent in 1972.

An increasing proportion of farms are operated on a part-time basis and a decreasing proportion of persons living on farms cite farming as their principal source of income. In 1951, 18 percent of census farms reported something other than farming as their principal occupation; by 1971, this group had increased to 31 percent. The proportion of hired to total farm labor has increased from 20 percent in 1971 to 29 percent in 1976.

Measured in terms of improved land area, sales and capital investment, the average size of farms in Canada has been increasing steadily for several decades. Between 1951 and 1971, the improved area per farm increased 48 percent, from 80 to 118 hectares; average investment per farm expressed in current dollars increased from \$15,200 in 1951, to \$65,430 in 1971, to \$135,411 in 1975; expressed in 1971 dollars, the increases in investment per farm, 1951 to 1971, in buildings, machinery and equipment, and livestock were respectively 39, 50 and 60 percent. In 1951 4 percent of all farms reported sales of over \$10,000, whereas in 1971 the proportion was 31 percent and these produced 78 percent of total farm sales.

The average total net income of farm taxfilers amounted to \$10,018 in 1974 and of these 11 percent showed total net incomes of more than \$25,000 while 36 percent showed total net incomes of less than \$5,000. Of the \$10,018 total net income, \$4,452 was farm net income, with the remainder from other sources. Analysis of taxfiler data indicates that farmers who produce dairy products, hogs and poultry earn a smaller proportion of their net incomes from non-farm sources than producers of grain and cattle.

There has been a tendency to increase specialization on farms in the last two decades - the average number of major commodities produced per census farm decreased from 4.9 to 3.7 in the period 1951-71. This is particularly evident among producers of poultry meat, eggs, potatoes and hogs. While these commodities were traditionally produced as secondary enterprises on farms with another main enterprise, they are now usually produced on highly specialized farms.

In summary, farms are largely operated by individuals; the number of farms has been decreasing and the average size has been increasing so that the larger farms are contributing a larger proportion of total production; more farmers earn a significant proportion of their income from off-farm employment; there has been a significant decrease in the number of commodities produced on the average farm, the largest change being in the reduction in the number of small livestock enterprises which implies that farm families have become less self-sufficient in terms of food.

A Family-Farm Oriented Agriculture

Primary agricultural production in Canada is, in large proportion, carried out by family farms, and government policies and programs have shown preference for a family-farm oriented industry. The modern day family farm evolved from the traditional farm of an earlier age which largely functioned as an economically self-sufficient production and consuming unit, owning most of its assets - land and buildings, and producing many of the necessities both for production and consumption. While the traditional farm has virtually disappeared, Canadian agriculture remains to this day an industry composed of smaller family businesses.

In recent decades, especially the postwar period, there has been substantial mechanization of primary agricultural production with a concurrent reduction in the number of operators as small farms have been consolidated into larger units. This has resulted in an increase in the average size of farms but with considerable variability in the size of individual farm units. A significant number of rather large commercial operations have emerged many of which are still family businesses but some of which are not. Despite the trend to larger farms, most farms continue to be operated by private individuals, and small family farms continue to constitute a large proportion of the primary agricultural producers. Most operators of smaller farms do not have the same access to capital as do the larger operators, tend to be less technically sophisticated and often earn incomes which appear inadequate by today's standards. Operators of larger (but not necessarily very large) farms are often more knowledgeable and better equipped to take advantage of the factor substitution possibilities to remain competitive as input prices change.

If current trends continue, Canada can be expected to have about 250,000 farmers by the year 2000, about half of which will be primarily dependent on farming. It is projected that less than 100,000 farmers, (just over half located in the Prairies) operating larger tracts of land as partnerships and small corporations, will dominate farm production. On the other hand, Québec and the Atlantic region may record a significant decline in farm numbers with lesser reductions in Ontario and the Prairies and a slight increase in B.C. However, these projections can only be considered as tentative because the magnitude of future change in the relative prices of factor inputs, the rate of advance of technology and the lure of off-farm wages cannot be projected with certainty. Nonetheless, despite the trend towards larger units, the prospects for the near future are for the continued dominance of the one-or two-man family farm.

The economic rationale in support of the family farm is that the family-farm operator acts in his best interest (i.e. maximizes his earnings) by efficiently allocating the factors of production to the most profitable enterprises. Providing economies of size do not outstrip the capacity of commercial family farms to grow and develop, one can expect family businesses to remain competitive for some time to come.

A family farm based agricultural sector is said to be a superior form of social organization because it provides a higher quality of life (e.g. lower crime rates, less stress in daily life, etc.) than other settings. However, there seems to be little scientific evidence to compare the quality of life of family-farm society with alternative forms of social organization under ceteris paribus conditions. Additionally, indications are that the social structure which emerges in areas where the large scale family or non-family farm predominates may not be at all undesirable.

Environmental problems and the threat of eventual shortages of energy and non-renewable resources caused in part by technological advance are said by some to be minimized with a family farm structure. But new technologies have produced many positive effects and may very well have solved more problems than they have created. Further research on the impact of new technologies and their environmental consequences is required to confirm this line of argument in support of a family farm agriculture.

A family-farm oriented agriculture is said to foster the continuing viability of rural communities by providing a sound basis for their social and economic existence. What is especially feared is the development of communities wholly dependent for their prosperity on one (or a few) large specialized corporate farms; serious problems (e.g. loss of income and employment) could follow if such a farm were to fail, and economic power would be heavily concentrated among a few people.

The final reason for fostering family farms is that farmers have revealed their preference for this kind of farm structure. Therefore, governments have a responsibility to adhere to this demand (if it is not unreasonable) in the same way as they try to satisfy the needs of other interest groups (e.g. labour and business).

Four alternative government policy approaches can be proposed in regard to the structure of production units in primary agriculture. These are as follows: (1) discourage but not prohibit non-family businesses in order to enable family farms to continue to dominate this sector, and provide special assistance for small-scale farms to increase their competitive position vis-a-vis larger farm enterprises; (this alternative is the closest to current policy); (2) discourage non-family farm businesses (as per

approach #1) but provide no special assistance to small-scale family farms; (3) prohibit the expansion of non-family farm businesses and provide special assistance to small-scale family farming (as per approach #1); (4) prohibit the expansion of non-family farms and provide no special assistance to small-scale family farms.

Canadian economic philosophy of freedom of initiative and of encouragement of private enterprise makes unacceptable any government policy prohibiting non-family business although government appears more willing to discourage the expansion of large farm enterprises. Small producers are to some extent favored under current policies of eligibility for marketing quotas, FCC credit and assistance under provincial and federal stabilization programs.

There is no federal policy concerning optimal targets for small family farms, (e.g. the appropriate number of small family farms or what might be considered adequate levels of income) although some provinces have such policies. However, there are a number of assistance programs to foster the continuing viability of family farms (e.g. public credit assistance, training programs, marketing boards, etc.) but their success in helping lower income farmers become more competitive, in improving the equality of income distribution or increasing the number of farms is not well established. Policies to promote continuing viability of the small family farm will require competent advance research to facilitate selection of the appropriate set of programs which would foster the creation of family farm units capable of capturing most of the economies of scale thereby keeping Canadian agriculture competitive domestically and in foreign markets.

The challenge will be to re-design the programs to assist the small family farm operators to improve their managerial ability and adapt technology appropriate to their needs and give a greater feeling that their decisions are determining their own welfare. It is also necessary to assure their access on a continuing basis to borrowed capital. Other government programs should focus on developing new technology to offset the serious resource and climatic constraints faced by small farms (e.g. to develop methods to conserve soil and water resources) and to correct the institutional constraints represented by market share limitations imposed on small family farm operators.

Farm Product Processing and Marketing

As illustrated in the following figure, primary agricultural commodities are marketed in a number of ways, including direct sales to processors, auctions, cooperatives and marketing boards. Products sold through marketing boards account for 50 percent of farm cash receipts. The proportion varies regionally; in Saskatchewan approximately 69 percent of farm cash receipts are from sales through marketing boards, compared with 36 percent in Prince Edward Island.

About 60 percent of the retail cost of domestically produced food is incurred by the process of transforming agricultural commodities into consumer products. This percentage varies appreciably among commodities; for meat products it is about 30 percent, for canned fruits and vegetables approximately 85 percent. This share of the consumer dollar has tended to increase with time as more processing and other services have been added to products before they reach consumers.

In 1974, the food processing industry accounted for 13 percent of all value added by Canadian industrial activity. The industry also provided 12 percent of the employment and paid 11 percent of the wages and salaries earned in Canadian industry.

The concentration ratios for the food manufacturing industries is a rough indicator of the degree of competition among processors of farm products. Breweries and tobacco manufacturers are among the most concentrated with over 90 percent of the product marketed by the largest four firms. The four largest meat processors account for 54 percent of shipments, while concentration in poultry processing, dairy manufacturing and bakeries is between 33 and 38 percent.

The retail food sector is of major importance to the Canadian economy in terms of the volume of sales and numbers of people employed. In 1975, about 22,000 food stores had gross sales of approximately \$12 billion and represented nearly 26 percent of the total Canadian retail sales. Food retailing is dominated by a few large firms which account for about 66 percent of the volume of sales (Appendix Figure 4).

Government involvement in marketing includes setting and enforcing health and quality standards, stabilizing farm prices, negotiating international trade policies, providing legislation to enable the formation of national producer marketing boards and engaging in the actual selling of grain produced in the Prairie Region through the Canadian Wheat Board.

The hotel, restaurant and institutional trade has been an expanding sector in food retailing. Estimated sales amount to \$4.3 billion, the food content of which was \$1.7 million.

Government Services for Agriculture

Research: During the past century, Canada has built a strong competence in agricultural research, and at present, there are about 1600 agricultural scientists in the country. Agriculture Canada conducts over 50 percent of this research with an annual budget of approximately \$116 million. This supports a major program involving about 900 scientists in the Research Branch at 47 establishments across the country, and smaller programs in the Economics Branch, Health of Animals Branch and the Canadian Grain Commission.

Research is also carried out at the universities in eleven faculties of agriculture which conduct about 30 percent of the national program. Research efforts by provincial governments vary from relatively little to an appreciable program in Ontario involving more than 100 scientists.

Industry conducts very little research but this is slowly changing through aid offered by the federal programs of National Research Council, Industry, Trade and Commerce, Agriculture Canada and other departments, and through the "Make or Buy" policy which promotes the contracting out of research work when feasible.

Research expenditures amount to about 2.5 percent of net farm income.

Extension: The BNA Act allocates major responsibility for agricultural extension to the provinces. However, in practice, the federal department has shared in this role. In a number of provinces, the trend appears to be for more service to commercial farmers, especially those in the lower income

range. Agriculture Canada performs a limited extension role at each experimental farm or research station. There are also such services available as CANFARM, Canadex, and Agriculture Canada publications. The farm supply industry sees extension as a key to long-term sales development and even the chartered banks have about 60 fieldmen at work across the country.

Information: Information programs are run by the federal and provincial departments of agriculture, universities and industry. The Information Division of Agriculture Canada carries out this function for the Department although some specialized information is dispensed by individual branches.

Education: Advanced education is available at a number of Canadian universities, provincial agricultural colleges, community colleges and CEGEPs. Agriculture Canada provides limited funds for university research that are used mainly for training of graduate students. Since education is a provincial responsibility, the Federal Government's only real involvement is in offering training to farmers through the Canada Manpower Training Program and to farm workers through the Canada Manpower Industrial Training Plan.

Production and Marketing: Through its specialists across the country, Agriculture Canada's Production and Marketing Branch administers 26 pieces of agricultural legislation which affect producers, processors and distributors. The marketing services of both federal and provincial governments are intended to assist agricultural producers in realizing from the market a fair return to management, capital and labour. The various divisions, Dairy, Fruit and

Vegetable, Grains and Special Crops, etc. each have their own areas of specialization, but in their inspection, grading and regulatory duties for all crop and animal commodities, they work closely with other federal departments, provincial governments, and producer organizations in relation to the need. They also inspect processing and slaughter plants, provide for the registration of feeds, fertilizers and pesticides and the licensing of seed varieties, as well as certifying plant material for both importing and exporting purposes.

The Marketing Services Division of Agriculture Canada is responsible for improving the agricultural marketing services of the country. Through the Agricultural Products Marketing Acts, it can extend federal marketing powers to provincial marketing boards for the control of produce destined for interprovincial and international trade.

Other Services: The Health of Animals Branch controls and regulates the importation of animals and animal products, eradicates established diseases, and is responsible for the certification of livestock for export. It also administers the Canada Meat Inspection Act which requires that all meat slaughtering and processing plants dealing in interprovincial and export trade operate under the federal meat inspection system.

The Economics Branch has a research function in defining economic problems, identifying economic opportunities, recommending policies and programs and contributing to a better understanding of opportunities and problems through research.

The Food Systems Branch is concerned with the interaction of the various agencies involved in Canadian agriculture. It performs a coordinating and informational function among the various sectors of the food system. In doing this, specific goals for the industry have been developed and priorities established for the various commodity areas.

Instability in Canadian Agriculture

Extent and Impact: Agricultural instability in Canada affects producers, consumers and input markets. Producers' incomes are highly vulnerable to fluctuations in price and output for four reasons: (1) a high proportion of agriculture is located in the Prairie Region where output is unstable due to fluctuations in annual rainfall; (2) Canadian agriculture is particularly exposed to international market fluctuations because about 40 percent of agriculture's gross income is derived from exports; (3) supply and demand elasticities are such that changes in output and price result in unstable gross incomes; and (4) the fact that input prices are relatively more stable than commodity prices means that net incomes vary even more than gross incomes.

At the consumer level, retail prices vary less than farm prices due to the higher price elasticity of demand at the retail level. Income and employment in agriculture-specific input suppliers, such as farm machinery and fertilizer, are significantly affected. The land market is greatly influenced by currently attainable net incomes which lead to over-investment in land relative to longer run returns.

Canadian Programs: The Government has developed a variety of programs to protect producers against the results of instability. These programs fall in the general categories of direct price or income stabilization, insurance against crop failure and supply management. The guiding principle of both price and income stabilization programs is to ensure that gross producer revenue covers cash costs to ensure solvency in the short-run, but not to interfere with long-run adjustments in production by guaranteeing returns to fixed assets. Another principle is that a maximum limit is set for indemnity payments on the grounds that larger farm businesses, because they have larger financial resources, are better able to cope with instability. A second principle is that indemnities are paid in the form of deficiency payments to eligible producers based on market prices.

The Agricultural Stabilization Act of 1975 provides the legislative authority to stabilize prices received by farmers in Canada. The prices to producers of nine commodities are maintained at not less than 90 percent of the average market price over the last five years, adjusted for changes in cash production costs. The Act also provides that other commodities may be designated for similar price stabilization by Order-in-Council.

A minor contributor to price stability is the Initial Payment System of the Canadian Wheat Board which has the effect of providing a price floor for grains produced in the Prairie Region. Likewise the Two-Price Wheat Act provides a measure of price stability. The Act fixes a domestic price and, if the export price is above this, the Government pays the difference, up to a specified maximum, to the Canadian Wheat Board. Thus, the cost of wheat to Canadian consumers is kept down and, at the same time, a floor price is provided to farmers.

Income stabilization is exemplified by the Western Grain Stabilization Act designed for the grain sector in Western Canada. The Act provides for the creation of a fund from which an indemnity payment is made to participating producers in a year when net cash flow, appropriately defined, falls below the average of the previous five years.

In addition to price and income stabilization, the federal-provincial program of crop insurance complements price and income stabilization programs by insuring individual producers against losses from natural hazards.

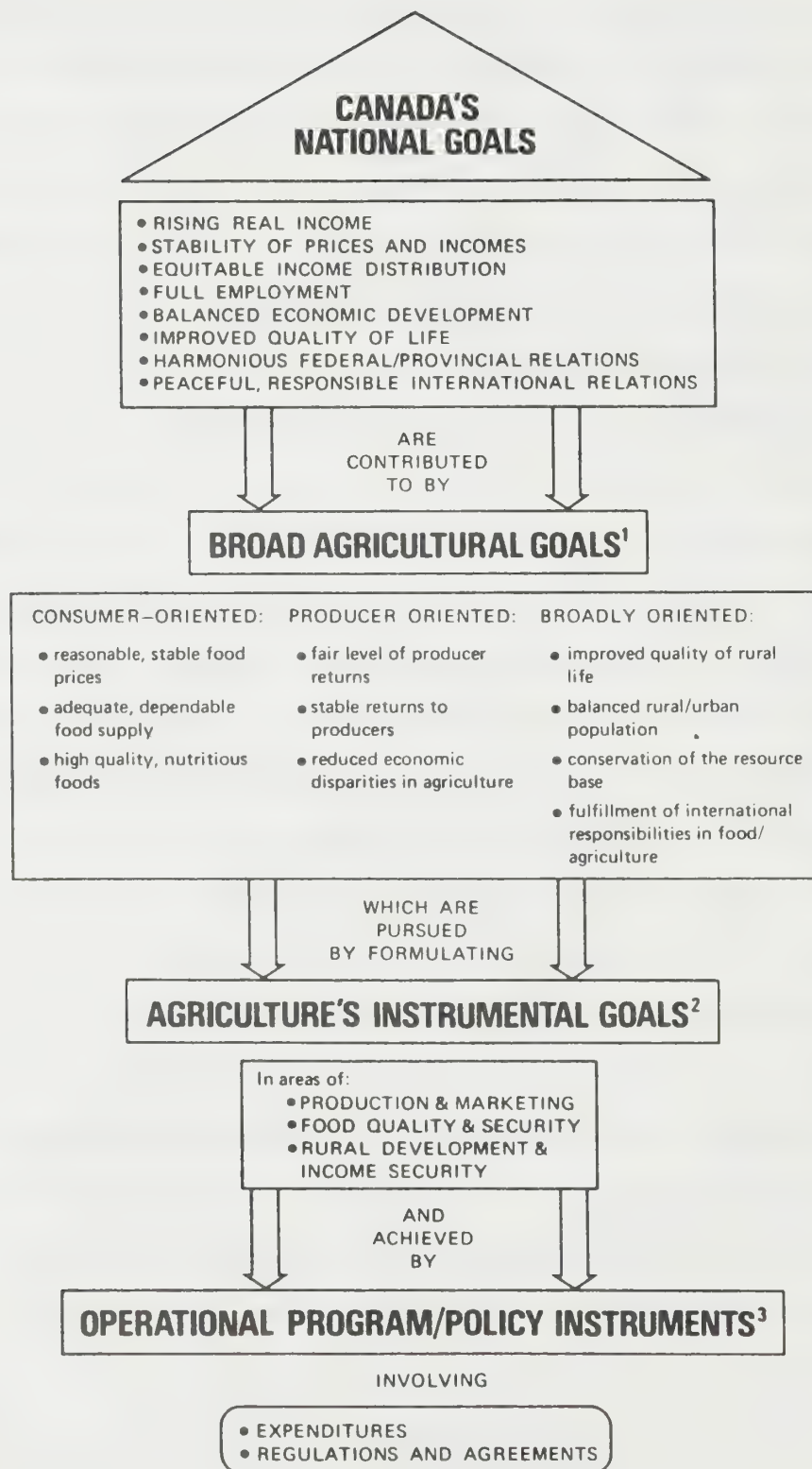
Finally, supply management plans, designed to ensure the return to all assets, as well as the short-run stability of income, are in place for a number of commodities. Supply management is practised by the Canadian Dairy Commission for manufacturing milk, butter and cheese, by agencies set up under the National Farm Products Marketing Agencies Act for eggs and turkeys and by certain marketing boards under provincial jurisdiction.

Canada's International Interest in Stabilization: Canada's concern about the instability of international commodity markets has been demonstrated by Canadian participation in international agreements. These agreements could liberalize trade by providing all participants with the same access to individual markets and ensure greater stability of producer incomes in exporting countries. The use of buffer stocks to overcome large fluctuations in grain prices has been proposed on many occasions. A successful scheme could benefit both exporters, by providing protection against unduly low prices in years of high production, and importers, by providing protection against rapid price increases in years when shortages develop. Although agreeing in principle with the buffer stock proposal, Canada is concerned about certain operational implications, particularly the price effects of releasing and replenishing stocks.

Policy Instruments and Agricultural and National Goals

The following is a resumé of a study which examined how government expenditures and regulations affecting agriculture have contributed to the attainment of agricultural and national goals. The procedure used was to define the relevant goals, identify distinct categories of policy instruments and, where possible the effort expended on each category, assess progress in achieving instrumental goals by examining selected performance indicators, consider major influences outside the domain of Canadian policy which have affected the performance indicators and identify important conflicts and tradeoffs among goals.

As a prerequisite to the main purpose, general relationships within the four level hierarchy of national goals, broad agricultural goals, instrumental goals for agriculture and program instruments, were analyzed to identify some of the most important relationships between each set and the one immediately above it in the hierarchy. The following diagram provides a schematic description of this hierarchy of goals. Canada's agricultural goals and national goals occupy the top half of the diagram. The achievement of agricultural goals, however, is attained through more specific instrumental goals associated with program/policy instruments. These are of two kinds: i) programs to which resources are allocated and ii) laws and regulations which largely determine agriculture's position and status in the national economy. Thus, the chain of impact begins with the adoption and use of program/policy instruments with objectives designed to promote the broader agricultural goals, which in turn support Canada's national goals.



The study began by defining the goals at each of the four levels, indicating as far as possible the extent to which goals at a lower level support those immediately above. Between the agricultural goals and the national goals, as well as between agriculture's instrumental goals and the agricultural goals, the relationships were derived from subjective evidence. They are shown as positive, negative or neutral relationships and, in general, they confirm the existence of a high degree of consistency between the goals for agriculture and the broader goals of Canadian society.

The instrumental goals are achieved through specific policy/program instruments which fall into two main categories - programs to which resources are allocated and laws and regulations which guide the industry. The relative impacts of these instruments were indicated by: i) the absolute and proportionate expenditures in each sub-category of program/policy instruments to which resources are specifically allocated, ii) the positive, negative or neutral relationships between the program/policy instruments and the relevant instrumental goals, iii) the progress in achieving instrumental goals as revealed by selected performance indicators, iv) the existence of important conflicts and trade-offs among goals. In addition, major influences outside the domain of Canadian policy, which have affected the performance indicators, were considered.

National, Agriculture and Instrumental Goals: The set of national goals was assembled from various public documents including recent Speeches from the Throne and federal policy statements by Ministers. While agriculture makes an important contribution to these goals, their full attainment requires

high levels of performance by all sectors of the economy. The national goals are interdependent; some are mutually reinforcing while others are sometimes in conflict. The agricultural sector contributes to national goals by pursuing broad objectives, some of which are unique to agriculture. These agricultural goals were derived from sources similar to those for the national goals but particularly from statements issued by the Minister of Agriculture and from budget narratives prepared by the Department. While they have been grouped into consumer-oriented, producer-oriented and broadly oriented categories, it is recognized that these are not mutually exclusive and that there is considerable interaction among goals in the three categories.

The set of instrumental goals for agriculture (below) contribute to achieving the broad goals of the agricultural sector but are numerous enough and narrow enough in scope to permit identification with particular types of policy instruments. They are grouped into three general areas; Production and Marketing, Food Quality and Security, and Rural Development and Income Security, which are further divided into 14 subgroups as follows:

Production & Marketing

- a. Efficient Production
- b. Efficient Marketing
- c. Effective Resource Management
- d. Market Development
- e. Effective Food & Technical Aid

Food Quality & Security

- f. Nutritious Food for all Canadians
- g. Informed Food Consumers
- h. High Commodity Standards
- i. Diversification of Production
- j. Security of Imported Supplies

Rural Development & Income Security

- k. Increased Producer Bargaining Power
- l. Stability of Producer Returns
- m. Viable Farm Units
- n. Rural Community Development

Program/Policy Instruments: For each of these instrumental goals, the specific program/policy instrument(s) which support it is listed and referenced to the appropriate Canadex Code(s). Each instrument is noted as being primarily a program of expenditure or of regulation.

The percentages of funds allocated to twelve major expenditure-type instruments over the 6-year period 1970/71 to 1975/76 are tabulated below. The table shows that direct payments through commodity programs account for approximately one third of the total. Four other instruments each account for 10 to 17 percent of expenditures: storage and freight assistance; technical and food aid; social adjustment and rural economic development; and research programs. Together, these five policy instruments represent 85 percent of all federal expenditures on agriculture.

Share of Net Expenditures in Agriculture
1970/71 - 1975/76

	%	
1. Direct Payment Through Commodity Programs	34.1	
2. Storage & Freight Assistance	16.8	
3. Technical & Food Aid	12.8	
4. Social Adjustment & Rural Economic Development	11.6	
5. Research Programs	9.6	
Sub-Total		84.9
6. Testing Services	3.5	
7. Administration and Miscellaneous	3.2	
8. Trade Promotion	2.2	
9. Assistance in Producer Financing	2.2	
10. Crop Insurance	2.1	
11. Extension & Information	1.2	
12. Direct Payment through Social Programs	.7	
Sub-Total		15.1
TOTAL		100.0

The scope of regulations which affect the achievement of instrumental goals is quite broad. These instruments include trade and tariff measures, transport rates and regulations, tax laws, competition laws, administration of commodity markets, health standards and labelling, labor market and immigration rules, and land use decisions. Because there is no quantitative measure available to assess the efforts expended on these instruments, their importance is apt to be underestimated. Because of this, an attempt has been made to indicate the effect of all policy instruments on instrumental goals in terms of positive or negative relationships. In some cases, a mixed or unknown effect of an instrument has been shown, but where a definitive relationship exists it has been discussed in the text.

Indicators for Instrumental Goals: The third method of assessing the impacts of policy instruments was to compare the progress in achieving various instrumental goals by examining performance indicators. For each instrumental goal, some highlights of these indicators are noted in the following paragraphs.

1. Production and Marketing

(a) Efficient Production - Overall productivity of resources used in the Canadian agricultural sector has registered an average annual increase of only 0.07 percent over the period 1962-1974. Regionally, resource productivity increased in Ontario, Québec and the Atlantic Region, but declined in the Prairie Region and British Columbia.

Over the same period, labour productivity in agriculture has grown faster than in the balance of the economy. The increasing use of capital in lieu of labour in agriculture enhanced the value of output per dollar of labour input and helps to explain a gradual downward trend in the value of output per dollar of capital.

Yields per hectare and per animal unit have also increased due to improvements in varieties, nutrition, disease control and management practices.

In general, the indicators reveal that considerable gains in productivity per hectare, per man and per animal unit have been made, but these have been obtained largely by sizeable increases in capital input so that only small gains have been achieved in overall resource productivity.

(b) Efficient Marketing - Indicators of efficiency in activities which convert farm products into final form to make them available to consumers have shown little change since 1960. Inter-industry comparisons of the ratio of value-added as a percentage of value of output indicate that the food and beverage sector is quite similar to that for the average of all other industries. Distribution margins for major food commodities have remained fairly constant since 1970 with the exception of meat and poultry which showed a trend of narrowing margins that suggests increasing efficiency. In aggregate, the level of efficiency appears to have changed very little during this period.

(c) Effective Resource Management - Agriculture's share of total employment in Canada declined sharply from over 11 percent in 1961 to just over 5 percent in 1973 and has since remained at that level. However,

earnings of Canadian farm operators expressed as a proportion of GNP declined at a much slower rate, from 7.4 percent in 1961 to 5.4 percent in 1976.

This indicates that the system possesses the ability to adapt to very substantial changes in circumstances over a relatively short period of years.

The interest rates on agricultural loans have generally moved in parallel with commercial bank lending rates. However, farm borrowings under the Farm Credit Act have increased 300 percent over the period 1970 to 1977. The extent of this response to an increased demand for investment funds confirms the existence of considerable flexibility in the intersectoral flow of capital resources.

The area of irrigated land in Canada increased 36 percent between 1950 and 1960 and an additional 23 percent between 1960 and 1970. These substantial increases reflect the government's intention to make full use of this means of increasing the productivity of agricultural land resources and of offsetting the adverse effects of unpredictable shortages of rainfall in the growing season.

(d) Market Development - The volume indexes of Canadian agricultural trade indicate that, since 1973, imports have continued to increase while exports have fallen. For some commodities, the decline in export volume is a matter of serious concern.

Net imports as a percentage of domestic consumption have remained relatively constant for poultry products since 1961, but have increased for beef, lamb and most horticultural crops.

An integrated part of the overall plan for developing the markets for Canadian agricultural products is the government's policy of increasing the nation's capacity to process domestic raw materials into final consumer goods. The performance indicators appear to confirm the need for such a policy.

The indexes of real domestic product show that the rate of increase for processing of bakery and dairy products has generally kept pace with the rate of population change over the period 1961 to 1975 while the growth rates for grain milling, meat production and food and beverage manufacturing have all exceeded the rate of population increase.

(e) Effective Food and Technical Aid - Since 1968, the value of shipments of Canadian food aid has increased 223 percent. However, despite this absolute increase, food aid represents a proportion of only 0.1 percent of domestic GNP. On the other hand, development assistance in absolute terms has increased nearly 5 fold over the same period which represents an increase from 0.2 to 0.4 percent of GNP.

If one accepts the view that food aid is counter-productive in terms of long-run efforts to raise the level of agricultural self-sufficiency of developing nations, the Canadian emphasis on the provision of technical assistance may well be in the best interests of the recipient countries.

2. Food Quality and Security

(f) Nutritious Food for all Canadians - Since 1961, the average income of the lowest 20th percentile of the Canadian population has increased 156

percent while the increase in the price of food consumed at home has been 105 percent. Some progress has therefore been made in making the basic necessities of food more affordable to low income Canadians.

(g) Informed Food Consumers - Agriculture Canada's activities in this area roughly doubled during the period 1968 to 1976. The increasing numbers of general and technical mail enquiries demonstrate a continuing high level of public interest in questions related to food and agriculture.

(h) High Commodity Standards - Federal expenditures on meat inspection increased by 95 percent in the past five years. Inspection services on fruits and vegetables have been maintained at a consistent level over the last ten years. Such inspections assure foreign and domestic purchasers that minimum standards of quality are met or exceeded.

(i) Diversification of Production - The proportion of farm cash receipts generated by most of the major animal products has remained relatively constant during the past 11 years with the exception of eggs for which it has declined slightly. The percentage of farm cash receipts derived from grains and oilseeds has been fluctuating over the same period while horticultural crops have shown a decreasing trend since 1970. There is little or no evidence of increasing overall diversification.

(j) Security of Imported Supplies - The United States is the largest supplier of Canadian food imports from all sources, while Oceania and the European Economic Community account for 11 and 7 percent respectively. Although Canada relies heavily on the United States for imported supplies,

many of these commodities, such as meat, feed and horticultural products, could be readily replaced by alternative sources or by expanding domestic production. Therefore, this instrumental goal is one which has been relatively easy for Canada to achieve.

3. Rural Development and Income Security

(k) Increased Producer Bargaining Power - For certain commodities such as grains, dairy products, poultry and eggs, 75 percent or more of the sales are now made through marketing boards or agencies which are operated or supervised by the government. On the other hand, three quarters of the vegetables, 90 percent of the oilseeds and almost all cattle are not marketed through boards and agencies. The program/policy instruments to achieve this goal have therefore been highly commodity-specific and the emphasis placed on increasing producer bargaining power has varied from one commodity to another.

(l) Stability of Producer Returns - The fluctuations in farm-gate prices for cattle, hogs, broiler chicken and eggs since 1972 have been less extreme in Canada than in the United States. The greater relative stability of chicken and egg prices is partly attributable to the role played by federal and provincial marketing boards.

During the fiscal years from 1961 to 1976, the number of farmers who participated in government-assisted crop insurance programs increased over thirty-fold, while the value of coverage rose even more rapidly as the average amount of coverage per farm nearly quadrupled to reach over \$10,000.

To cushion the impact of temporary but severe declines in market prices, over \$2 billion in deficiency payments were made under the Agricultural Stabilization Act during the 18-year period ending March 31, 1976.

(m) Viable Farm Units - Between 1971 and 1974, the average net income of farm taxfilers increased from \$4,384 to \$10,018. During this period, farm income of such taxfilers rose 260 percent while their non-farm income rose 77 percent. In 1974, according to taxfiler data, non-farm income represented 55 percent of net income of farm taxfilers.

Despite the large increase in farm income of farm taxfilers, the viability of many farm units continues to depend on the availability of opportunities to earn off-farm income.

(n) Rural Community Development - There has been a marked levelling off in the rate of urbanization of the rural population as shown by the fact that the fraction of the population in rural communities seems to be stabilizing.

Assessment of Performance: The Performance indicators which have been examined provide a very incomplete picture of agricultural programs so the conclusions to be drawn from them are necessarily subjective. However, in comparison it appears that performance has been weakest in the area of production and marketing, somewhat stronger in the area of food quality and security, and strongest with respect to the goals grouped under rural development and income security.

The indicators of efficiency in production, efficiency in marketing and market development suggest a relatively weak record of performance. While certain instruments such as research expenditure clearly have a positive impact on these goals, others such as trade and tariff measures, transport rates and regulations, and administered marketing has had negative impacts.

Most of the indicators for food quality and security suggest stronger performance. However, there is considerable scope to improve the health of Canadians by adopting better balanced diets. While nutritious food is available to meet the demand for it, food consumers are either not aware or not sufficiently concerned about adequate nutrition.

Performance in the area of rural development and income security is strongest of the three sets of goals, thereby reflecting the attention devoted by policy instruments. A major portion of total expenditures has been aimed at ensuring stable producer returns, viable farm units and rural community development. In addition, regulations permitting producers to organize to market their product and to influence price have increased producer bargaining power.

While it is difficult to assess performance respecting broad agricultural goals, certain generalizations can be made from the indicators for instrumental goals. Performance in the category of consumer-oriented goals appears to have been fairly good, reflecting stronger performance in promoting food quality and security and weaker performance in the areas of production and marketing. Performance in the category of producer-oriented goals has been mixed, reflecting improvements in income security but weaker

performance in production and marketing. Achievement of broadly-oriented agricultural goals appears to have been relatively successful, reflecting the progress in achieving rural development goals.

Influences Outside the Domain of Canadian Policy - The development of Canadian agriculture has been considerably influenced by factors outside the purview of Canadian policies. The migration of large numbers of people from rural to urban areas has reinforced the trend to substitute capital inputs for labor in farming. This has increased the investment required for anyone entering farming and raised the level of management skill required to operate a farm. The willingness of Canadians to pay for services as part of their food purchases has reduced the share of the consumer's food dollar received by farmers. The growing market power of large agribusiness firms and food marketing chains has only partially been compensated for by enhancing the market power of farmers through marketing boards.

On the international side, trends in demand and supply suggest that the frequency and range of fluctuations in cereal output will increase and that trade in cereals between North America and developing countries will expand considerably. Policies of other countries have had important implications for Canadian agriculture. The entry of the United Kingdom into the EEC, where the Common Agricultural Policy prevails, has reduced Canadian exports of certain agricultural products. In addition, this Policy led to surplus dairy products, depressing world markets for butter and skim milk powder. The USSR decision in 1973 to compensate for a shortfall in grain production by purchasing on world markets rather than by restraining domestic demand was a major contributing factor to food price increases from 1973 to 1975.

The policies of the EEC and USSR considerably destabilized world commodity markets and such instability has encouraged the development of Canadian programs to reduce the effect of instability on Canadian producers and consumers. While the United States agricultural policy has become more open and market oriented in grains, strong protectionist sentiments prevail in certain sectors, especially livestock, where the United States producers are not as competitive as they are in grains. International arrangements, such as the GATT or commodity agreements, have had little positive effect on resolving international agricultural problems.

Conflicts and Tradeoffs Among Goals - In the main, Canada's national and agricultural goals are either mutually reinforcing or neutral in their effects on one another. However, there are important instances where goals conflict. For example, efforts to reduce economic disparities in agriculture contribute to the national goals of equitable income distribution, balanced economic development, full employment and harmonious federal-provincial relations but are in potential conflict with the goal of rising real income. Details of these relationships among goals are illustrated in Matrices 2 and 3 of the full text of this study.

Conflicts and tradeoffs among goals present a challenge to policy makers to seek a combination of expenditure type programs and regulatory instruments which promote national goals most effectively. Inherent conflicts among goals and conflicts which depend on the type of policy instrument chosen, will continue to require restraint in the pursuit of certain goals.

The potential conflict situations identified in the text of this study included the tradeoff between equity and efficiency goals, the tradeoff between consumer and producer goals, the tradeoff between stability and flexible resource use and the conflict between the use of certain policy instruments and efficiency goals. These potential conflict situations can sometimes be avoided by judicious use of policy instruments, but usually hard choices must be made to sacrifice better performance towards one goal in favour of furthering other goals. These choices necessarily depend upon the assessment made of the prevailing situation and the choices available to improve it as well as the political judgment of the relative importance of various goals.

Demand and Supply Potential

Domestic Demand: Domestic demand is primarily a function of demographic factors and personal disposable income. Among the former, population size is the more important, although distribution with respect to age and among rural and urban areas, and social customs are also elements of demography which influence demand. In the background studies^{1/} on which this section is based, population size was accepted as the dominant demographic factor.

The future size of population in Canada depends on natural growth and net immigration. Depending on the assumed rates of change in those two variables, low, medium and high population estimates of 27, 30 and 33 million persons have been made by Statistics Canada for 2001 A.D.^{2/} These 3 estimates

^{1/}Projections of Canada's Agricultural Capacity. Interdepartmental Food Policy Review Committee Study No. 7, 1974.

Land Use for Agricultural Purposes. Background paper prepared by Agriculture Canada for Interdepartmental Task Force on Land, 1975.

^{2/}Population Projections for Canada and the Provinces, 1972-2001, Statistics Canada. Table 6.2, pages 61 and 62.

have been used as the population variable in the demand scenarios.

The second important variable is real personal disposable income (PDI). In Canada, where obesity is a more serious concern than malnutrition, the total food consumed in caloric terms is not influenced significantly by PDI. Consequently, the income elasticity of aggregate demand for food products is low. However, for specific items income elasticity is relatively high, e.g., selected meat products and specialty cheese, but for other items, such as wheat flour, it is very low or even negative.

Recently, Canadians have been urged to moderate their eating habits for the benefit of their health and to conserve food for those persons in the world who are undernourished. The Department of National Health and Welfare has published recommended per-capita consumption levels in the Canada Food Guide^{1/}. It is very difficult to estimate how much influence, if any, such guidelines may have on the demand for food. Nevertheless, they do state the requirements for an economical, adequate diet, and for that reason have been used in this paper as one scenario to provide a comparison with the food requirements associated with the two levels of per-capita income.

The above two criteria, per-capita income and per-capita nutritional requirements, were used to define 3 scenarios (Appendix Table 1) to project the domestic demand for food in 2000 A.D. which was then expressed in terms of the required output of field crops at 3 levels of population. The total amounts of cereal, oilseed, horticulture and forage crops were calculated by aggregating the demand for crop products for direct human consumption and

^{1/}How to Plan Meals for Your Family, Nutrition Division, Department of National Health and Welfare, 1970.

the derived demand for crops required to produce the animal products.

Scenario 1 assumes per-capita consumption based on the current level of Canadian incomes. Scenario 2 assumes per-capita consumption that would be generated by a level of economic growth which would result in an annual increase of 4.5 percent in real per-capita income up to 2000 A.D. Scenario 3 assumes that the principle, which would govern consumers' purchases of food, would be to choose foods which would provide nutritional requirements economically, i.e., Scenario 3 represents the demand for food which would result if consumers purchased food economically to meet nutritional requirements of the Canada Food Guide. Within each of the 3 Scenarios, the requirements for cereals, oilseeds, horticultural and forage crops in 2000 A.D. were calculated for 3 levels of population projections of 27, 30 and 33 million persons. The aggregate demand projections therefore cover ranges of fast to slow rates of population growth, and minimum to maximum per-capita food requirements.

The demand projections indicate, that if current per-capita consumption patterns were maintained (Scenario 1, Appendix Table 1), Canadian population of 30 million in 2000 A.D. would require approximately 36 percent more crop output. If economic growth in Canada were achieved at the high level projected by Statistics Canada for the year 2001 (Scenario 2 Appendix 1), a population of 30 million would require approximately 90 percent more cereal and oilseed products, about 42 percent more horticultural products and 133 percent more forage crops. If Canadians were to adjust their eating habits to the guidelines of a nutritionally adequate diet (Scenario 3), the consumption of cereal crops by a population of 30 million would decrease by 11 percent because the reduction in consumption of animal products would reduce the need for feed

grains; the demand for oilseeds would increase by 57 percent, for horticultural crops by 118 percent and no change for forage crops (Appendix Table 1).

Domestic Supply: There are four principle means of altering crop output:

- (i) by varying the use of inputs such as fertilizers and chemicals to control weeds and plant diseases,
- (ii) by adjusting the proportions of different crops and summerfallow,
- (iii) by increasing or decreasing the total agricultural land base, and
- (iv) by introducing output increasing technology.

Short-term production adjustments to conform to changes in prices and costs usually can be made by altering inputs per unit of land and cropping patterns. However, many producers limit the use of purchased inputs because of problems of financing or because of inadequate knowledge of available technology. Consequently, there is a wide variation among producers in the output achieved per unit of land. Since it has been estimated that inputs such as fertilizer and pesticides can contribute 50 percent or more to total yields, cultivated area alone is an inadequate indicator of potential production.

Longer-term adjustments can be made by expanding or contracting the total area of land used by agriculture, and by adjusting the distribution of crops to the ones best adapted to each climatic region. The land area used by agriculture has remained relatively constant for many years but this has resulted from substantial decreases in farmland in eastern Canada offset by increases in the west. These shifts have had a negative impact on potential production because the land lost to agriculture in eastern Canada

is located in more productive climatic regions than the new land acquired in the west. It has been estimated that the land lost to agriculture in central and southern Canada is potentially 3 to 6 times more productive than new land brought into agricultural use. Currently, approximately 32 million hectares of suitable land in Canada are not utilized by agriculture but this reserve is located in the least favorable climatic zones and would not be capable of contributing to production in proportion to the area involved.

Adjustments in crop distribution to emphasize the most productive crop species or rotation in various climatic regions usually are made rather slowly. Examples would include the rates of reduction in summer-fallow and adopting new forage species in semi-arid regions, and the production of wheat in areas where alternate crops could produce higher total digestible nutrients per unit of land. There are many economic and social forces which delay or prevent rationalization of land use to gain such adaptive advantages.

In attempting to estimate future supply, one must make some assumptions about the above factors. Supply Scenario 1 (Appendix Table 2) assumes that the forces which have influenced yield in recent years would continue in the future, and that land use and area would remain as in the base period. Consequently, Supply Scenario 1 is a projection to 2000 A.D. of the yield trends established during the period 1960 to 1971, the base being the average annual output 1970-74. Another approach (Supply Scenario 2) would be to assume that a high level of management would be adopted by farmers on the land capable of sustained production of cultivated crops (CLI classes 1-3).

Yield estimates appropriate to this assumption have been made by others^{1/}.

In Scenario 2, the average annual output of 1970-74 has been projected to 2000 A.D. on the assumption that crop distribution would remain as at present and that lower class lands would be used for grazing or forage production.

This analysis suggests that cereal crop production could increase by approximately 35 percent by 2000 A.D. (Appendix Table 2) assuming incentives about the same as during the past 15 years; oilseed crop production could increase approximately 27 percent, horticultural crops 5 percent and forage crops 10 percent. If economic incentives and land use policies were to stimulate production to the high productivity level assumed in Scenario 2, the production of cereal crops could increase 75 percent, oilseed crops and horticultural crops 50 percent, and forage production 65 percent.

Potential for Surpluses and Deficits: In the supply-demand scenarios shown in Appendix Tables 1 and 2, the difference between production and domestic demand projected to 2000 A.D. would represent a surplus available for export or a deficit which could be made up from a combination of imports, extending land use, intensifying production and developing output increasing technology. Appendix Table 3 shows the surpluses and deficits associated with each of 6 combinations of supply and demand; as a base for comparison, the current situation (1970-74) is also shown. All combinations of the supply-demand scenarios projected to

^{1/}The Agricultural productivity of the Soil of Ontario and Québec.
Agriculture Canada Monograph No. 13, 1973.

Land Resources, Production Possibilities and Limitations for Crop Production in the Prairie Provinces. In Oilseed and Pulse Crops in Western Canada, 1975.

The Agricultural Productivity of the Soils of the Atlantic Provinces.
Agriculture Canada Monograph No. 12.

2000 A.D., except the combination of strong domestic demand (Demand Scenario 2) and 1960-71 trend in yields (Supply Scenario 1), would generate a substantially larger surplus of cereals. For oilseed crops, Canada would be approximately self-sufficient under each of the combinations of demand and supply projections. Horticultural crops show increasing deficits developing under most of the combinations of supply and demand scenarios. Forage crops show very large deficit positions under the strong demand scenario and large surpluses under the economic nutrition scenario.

The significance of these data therefore is that the level of the domestic demand for agricultural products could be very different depending on the rate of population growth, rate of growth in real income per capita, and the influence that advice respecting diet might have on the eating habits of Canadians.

If Canadian agriculture increased productivity along the trend line of the sixties (Supply Scenario 1), there would be substantial deficits in horticulture output, particularly under Demand Scenario 3; there would be substantial deficits in forages except under Demand Scenario 3 and especially under Demand Scenario 2; the surplus of cereals would be larger than at present except under Demand Scenario 2, when it would be much reduced.

The high productivity supply scenario would generate substantial surpluses of cereals, and would approximately balance demand in horticulture output except under the economic nutrition scenario. It would produce a surplus of forage under the demand scenario which assumed growth in population but not in per-capita income, but would result in a large deficit under the assumption of population growth coupled with rising real income per capita.

It can be seen from the data that the projected surplus-deficit positions of the commodity groups are strongly influenced by the supply-demand scenario which is assumed. The data do suggest that if a strong supply oriented policy were followed, cereal surpluses would be substantially larger than at present but forage supply would be inadequate to meet the needs of a population growing at the medium projected rate and with a rising per-capita real income. If recent trends in the growth of supply continue, the data show deficits developing in forage, horticulture and oilseeds.

Export Demand - which provides the market for 30 to 40 percent of Canadian agricultural output, is heavily concentrated in wheat and feed grains. Countries within the Organization for Economic Cooperation and Development, (OECD) primarily the European Economic Community (EEC) (including the United Kingdom) and Japan, have provided large and reasonably predictable markets for Canadian grains. East European socialist countries and China have become significant markets for Canadian grains but with less stability than OECD markets in the amounts purchased. Sales to developing countries have been small and some of these have been made at concessional prices.

Export demand is determined in general by the size of the population and the purchasing power of individuals in countries abroad, but Canada's share of that market is determined by the competitiveness of Canadian products and the accessibility of foreign markets to these products. Accessibility is dependent on the policies of importing countries, and this factor often overshadows competitiveness as the one primarily determining sales in those markets or commodities produced in Canada. Therefore, projecting the level of export demand for Canadian agricultural commodities is fraught with the uncertainty associated with predicting the direction of the policies of importing countries.

The export of cereal grains to countries classed as developing and as planned economies developed during the sixties. This involved commercial sales to both groups and concessional sales to the developing countries. Continuation and further expansion of the imports on a commercial basis by both groups will depend on the emphasis and success of their agricultural development policies, their trade policies with respect to food and the aggressiveness of Canadian market development activities. Continuation of concessional sales depends also on the supply and policies of developing countries but in addition the export policies of the major cereal producers and the international attitude to food aid will be important factors.

With respect to concessional sales many uncertainties, including the direction of domestic public opinion and world opinion as expressed in the new economic order, could enter into the size and nature of this market. Moreover, if the existence of large supplies of agricultural commodities should dominate world markets, major exporters would be more interested in promoting various types of concessional sales.

A consensus that the world has adequate food producing capacity seems to emerge out of the numerous studies which have examined the question of world food needs and supply potential.

The developed countries could expand their agricultural productive capacity both by intensification and by developing land. In these countries, manpower, capital and agricultural technology are available to increase food production by further intensification of agricultural production. Land supply, often thought of as a limiting factor in the expansion of agricultural output in the developed countries, has been shown in a recent study^{1/} to be adequate in the United States and Australia to support considerable agricultural expansion over the next 15 years. The OECD study reasons that the existence of this inherent productive capacity will enable the developed countries to adopt policies aimed at greater self-sufficiency. The OECD therefore foresees a decline in the volume of international trade among the developed countries.

The developing countries will need increased supplies of agricultural commodities to feed growing populations and to provide for demand generated out of expected rising real incomes. Many of them have a large food production, particularly countries of South America and Africa which have large areas of undeveloped land resources, but all of them could increase output through the application of improved agricultural technology. In spite of their agricultural potential, these countries may find their greatest comparative advantage in producing non-agricultural labor intensive products and importing agricultural food commodities (specifically wheat) in which case growth in

^{1/}Organization for Economic Cooperation and Development, Study of Trends in World Supply and Demand of Major Agricultural Commodities, Paris, 1976.

those markets could develop as an addition or an offset to any decline in trade among the developed market economies.

In the planned economies, the potential for expansion of production is fairly large, particularly in the Union of Socialist Soviet Republics (USSR) but quite expensive to exploit because of physical and climatic factors. These also result in a high degree of uncertainty in crop yields in the USSR because such a large proportion of the agricultural land is located in areas of low and highly variable rainfall. Yield variability, depending on storage policy, can change the USSR from an importer to an exporter from one crop year to the next.

In total, from the 3 groups of importers the evidence is that there will be a substantial market for cereal grains with shifts from traditional markets to new ones in developing countries. The uncertainty in both the demand and supply will be a dominant factor and will likely result in unstable prices and sales volumes from one year to another.

The demand that can be generated for Canadian animal products in the developed countries will first depend on import policies, on the part of potential importers, which grant reasonably favorable access to their markets but will also be highly dependent on aggressive market development coupled with assured delivery, dependable quality and competitive prices. The demand for animal products in the developing countries would increase if real incomes would grow, but so would the capacity to produce the feed requirements for animal production. It is unlikely that Canadian agriculture could look for an expansion in the sales of animal products to these markets.

Maximizing Agricultural Production

The statement is often made that Canadian agriculture should produce to the maximum because the world is short of food. In this paper, some of the underlying reasons for the statement are examined. Also, an estimate is made of the maximum output from Canadian agriculture assuming high rates of growth in the productivity of land and using all land classified in the Canada Land Inventory as having some agricultural potential.

The results of this analysis put the upper limit on Canadian agricultural production substantially above the higher level projected in Supply Scenario 2. They show that in the best managed agricultural system geared to maximize output, cereal production could be 140 percent greater than the current level, oilseed could be 125 percent above and forage crops 270 percent. While these results may be fanciful in terms of current economic incentives and market needs, they are consistent with statements from various sources that world agriculture has the capacity to feed a much expanded world population if the means could be found to utilize a greater proportion of the potential production capacity of conventional agriculture.

There are a number of reasons for continuing to support programs to expand agriculture faster than commercial demand would require: greater support to world food programs, continued development of food production capability in Canada to meet potential growth in domestic and export markets, production programs in Canada providing the resources and information required to undertake international development projects, and harmonious international relationships which are highly dependent on lessening disparities in the availability of world food supplies.

A policy of maximizing output would require large income transfers from other sectors of the Canadian economy and substantial sacrifice of freedom of choice on the part of farmers, and would be an expensive way of contributing to world food needs. Thus, it seems unlikely that maximum output would be an acceptable economic and political objective for agriculture. It may be expected therefore that the rate of expansion of agriculture will continue to be primarily related to the rate of growth of commercial demand.

CONCLUSIONS

Land

The orientation of Canadian agriculture is determined to a large extent by the quality of the land resource. At the present time nearly all the land in Canada, which is physically and economically suitable for agriculture, is under cultivation. Outside the boundaries of existing farms is a large area which could produce forage if the cost of land development could be reduced, or if the value of forage increased. The physical potential of the area is indicated by the large estimates for forage production under maximum production agriculture. The evidence, however, is that it would take large expenditures in research and development to overcome the problems which now prevent the economic use of this land, and that most likely the expenditures would be more effective if used for other agricultural development such as reduction in the area of summerfallow and improving forage yields on existing farms. Therefore, in the judgment of the Task Force the land which is now within the boundaries of farms may be regarded for economic reasons as the land resource on which the orientation of Canadian agriculture should be based.

Within the land currently used by agriculture only a small area is suitable, because of soil and climate, for crops other than certain cereals (wheat, oats, barley, rye), oilseeds (rapeseed and flax), and forage. Increasing agricultural output therefore would mostly involve those crops and the animal products which are produced from them. In the case of corn and soybeans, many of the production problems are being solved and large marginal gains in output can be expected but the land base for these crops will likely remain small compared to that most suitable for the cereals, oilseeds and forage mentioned above.

Technology

Agricultural research, development and services have combined to produce impressive technological development in agriculture over the past 25 years. Increases in yields per acre and per animal unit, declining feed input requirements, the control of weeds, insects and diseases and the use of labor saving equipment are evidence of the technological revolution in agriculture. Labor productivity (output per unit of labor) in agriculture stands out as having increased more rapidly than in other major industries in Canada. Agriculture uses much less manpower now than it did 25 years ago in spite of the fact that its output is much larger. This accomplishment has required a very large increase in capital, particularly in the form of machinery and equipment.

While there exists a great deal of data on the productivity of single factors only one published study has examined the ratios of total input to total output. The results show that increases in overall efficiency in

Canadian agriculture have been less than 1.0 percent per annum over a long period, which suggests that capital inputs needed to achieve the gains in productivity have offset the saving in other inputs. The Task Force feels that productivity is so important to maintaining Canadian agriculture in a competitive position that the above results should be carefully re-examined and extended by studies at the farm level. Also policies and programs for agriculture in Canada should be evaluated specifically to determine their effect on the overall productivity of resources.

Family Farm

The family farm remains the dominant form of business organization for agricultural production. It has demonstrated a remarkable ability to adjust as it has adapted to the technological revolution and altered its input structure to accommodate less labor and more capital. The family farms are larger borrowers of capital than they were 25 years ago but the owners' equity in total assets remains over 80 percent. Thus the family farm has financed the large expansion in capital inputs largely out of retained earnings and capital gains. The number of farms has decreased markedly and further enlargement and reduction in numbers is projected, but the dominance of the family farm as the basic farm organization is not seriously challenged by other forms of business organization.

Demand and Supply Potential

Projections of demand and supply were made based on the Canada Land Inventory. One projection (Appendix Table 3) shows that if Canadian agriculture retained the upward trend in yields achieved in the past 25 years,

and Canada's population grew at a medium rate, and the increases in income per capita were comparatively high, the output of oilseeds, horticultural crops and forage would fall short of domestic requirements and the current surplus of cereals would be much reduced. At the other extreme if yields were raised to the level now attained by the best farm managers and domestic food consumption were based on nutritional guidelines, there would be large surpluses of both cereals and forages and import requirements only for horticultural commodities. The likely situation would be toward the higher demand, which suggests that under current yield trends Canadian agriculture would probably export less cereals and oilseeds, and become a larger net importer of horticultural products and a net importer of beef.

Export Demand

The future level of export demand is highly uncertain due to its dependence on national policies. Developed countries could quite possibly become even more protectionist with respect to their domestic agricultural sectors because cheaper food is not critical to people in high income societies. The direction of development in developing countries could be to exploit their considerable agricultural potential or it could be to develop labor-intensive manufactured products to be exchanged for food. The large socialist countries will likely aim for self-sufficiency in food but could be in and out of the international market depending on whether crops were large or small.

In total the 3 groups of potential importing countries probably will provide a substantial market for cereal grains with shifts in the proportion

of imports from traditional markets to new ones in developing countries. Since weather is an important short-run factor, the outlook is for unstable prices and sales volumes from one year to another. This instability could be dampened by international agreements to maintain and release stocks.

Programs in Relation to Agricultural and National Goals

In the main the goals for agriculture have been consistent with Canada's national goals and in turn the instrumental goals for agriculture policy instruments have been consistent with the broad agricultural goals. The goals of the policy instruments fall into 3 groups: production and marketing, food quality and security, and rural development and income security.

The emphasis in terms of policy instruments is reflected in the fact that 85 percent of the federal expenditures on agriculture in the past 6 years have supported five groups of instruments: direct payments through commodity programs, storage and freight assistance, technical and food aid, social adjustment and rural economic development, and research. The emphasis indicated by allocation of expenditure is reflected in the fact that performance in the area of rural development and income security appeared to be the strongest of the three sets of goals. Most of the indicators of food quality and security suggest good performance even though there is considerable scope to improve the health of Canadians by adopting better balanced diets. However, nutritious food is available if consumers were sufficiently concerned about the need for adequate nutrition to create the demand.

The indicators of efficiency in production, efficiency in marketing and market development suggest a relatively weaker record of performance than in the other two. The overall productivity in the production and marketing sectors does not appear to have increased and market development has not been sufficient to prevent an increase in the value of agricultural commodity imports relative to exports. While certain instruments such as research expenditure clearly have a positive impact on these goals, others such as trade and tariff measures, transport rates and regulations and administered marketing have not been positive.

Conflicts and trade-offs among goals present a challenge to find a combination of expenditure type programs and regulatory instruments which promotes national goals most effectively. Potential conflict situations include the trade-off between equity and efficiency goals, between consumer and producer goals, the trade-off between stability and flexible resource use and the conflict between the use of certain policy instruments for income security and efficiency. Potential conflict situations can sometimes be avoided by judicious use of policy instruments, but usually hard choices must be made to sacrifice better performance toward one goal in favor of furthering others.

Factors External to Agriculture

The development of Canadian agriculture has been influenced in a major way by factors outside the scope of agricultural policy. The migration of large numbers of people from rural to urban areas has reinforced the trend to substitute capital inputs for labor in farming. This has increased the

investment required for anyone entering farming and raised the level of management skill required to operate a farm. The willingness of Canadians to pay for services as part of their food purchases has reduced the share of the consumer's food dollar received by farmers. The growing market power of large agri-business firms and food marketing chains has only partially been compensated for by the market power achieved by farmers through marketing boards in certain commodities.

On the international side, trends in demand and supply suggest that the frequency and range of fluctuations in cereal output will increase and that trade in cereals between North America and developing countries will expand considerably. Policies of other countries have had important implications for Canadian agriculture. The entry of the United Kingdom into the European Economic Community has made it subject to the restrictions of the Common Agricultural Policy (CAP) and has reduced Canadian exports of certain agricultural products. In addition, the CAP led to surplus dairy products depressing world markets for butter and skim milk powder. The decision by the USSR in 1973 to compensate for a short-fall in grain production by purchasing on world markets rather than by restraining domestic demand was a major factor in food price increases from 1973-75. Policies of the EEC and USSR considerably destabilized world commodity markets and such instability has encouraged the development of Canadian programs to reduce the effect of instability on Canadian producers and consumers. While the United States agricultural policy has become more open and market-oriented in grains, strong protectionist sentiments prevail in certain sectors, especially livestock where producers in the United States are not as competitive as they are in grains. International arrangements through GATT on commodity agreements have had little positive effect on resolving international agricultural problems of instability.

Table 1: Projections of Canadian Domestic Demand to 2000 A.D. for Field Crops
at 3 Levels of Per-Capita Consumption and
3 Population Projections

	Current Demand (1970-74)	Amount Required at Various Levels of Per- Capita Demand and Population 1/ Scenario 2 *										Scenario 3 ^{1/} Nutritional Requirement			
		Scenario 1 ^{1/} Current Income Per Capita			High Income Per Capita			Scenario 2 *			Scenario 3 ^{1/}				
		27	30	33	27	30	33	27	30	33	27	30	33		
Population X 10 ⁶					----- millions of tonnes -----										
Cereals	20.2	24.9	27.5	30.3	34.1	38.0	41.6	14.8	16.4	18.0					
Oilseeds	1.8 ^{2/}	2.2	2.4	2.7	3.0	3.4	3.8	2.3	2.6	2.8					
Horticulture	4.7	5.8	6.4	7.1	6.0	6.7	7.3	8.4	9.3	10.2					
Forage	40.6	49.9	55.2	60.9	85.3	94.6	103.9	36.5	40.6	44.7					

^{1/}Scenario 1. Demand generated by per-capita consumption estimated for 1970-72.
 Statistics Canada Cat. 32-226.

Scenario 2. Demand generated by per-capita consumption levels resulting from maximum economic growth.

Scenario 3. Demand generated by per-capita consumption levels as recommended in the Canada Food Guide. (How to Plan Meals for Your Family, Nutrition Division, Dept. of National Health & Welfare 1970).

Table 2: Projections to 2000 A.D. of Canadian Domestic Supply of Field Crops, Two Production Scenarios

Commodity Groups	Current Production (1970-1974)	Scenario ^{1/}	
		1 Trend	2 High Productivity
Cereals	34.0	46.4	59.9
Oilseeds	1.9	2.4	2.8
Horticulture	4.3	4.5	6.4
Forage: Improved Land	25.2 ^{2/}	27.7	41.7
-unimproved land	16.3 ^{2/}	17.9	27.0

^{1/} Scenario 1. Potential supply estimated by extrapolating 1960-1971 yield trends with crop distribution and areas as reported in the 1971 census.

Scenario 2. High productivity supply situation, assuming a high level of management on all class 1-3 agricultural soils with crop distribution proportional to 1971 census information.

^{2/} See Table 3.1 The Case for Maximizing Canadian Agricultural Production.

Table 3: Projections to 2000 A.D. of Surpluses and Deficits in Crops Produced in Canada under Two Supply Scenarios and Three Demand Scenarios with Population Projected to 30 Million.

Supply Scenario ^{1/}	Demand Scenario ^{2/}	Cereals	Oilseeds	Horticulture	Forage
----- Millions of Tonnes -----					
Current (1970-74)	Current (1970-74)	13.8	0.1	-0.4	0.9
1	1	18.9	0.0	-1.9	- 9.6
1	2	8.4	-1.0	-2.2	-49.0
1	3	30.0	-0.2	-4.8	5.0
2	1	32.4	0.4	0.0	13.5
2	2	21.9	-0.6	-0.3	-25.9
2	3	43.5	0.2	-2.9	28.1

^{1/}Scenario 1. Potential supply estimated by extrapolating 1960-1971 yield trends with crop distribution and areas as reported in the 1971 census.

Scenario 2. High productivity supply situation, assuming a high level of management on all class 1-3 agricultural soils with crop distribution proportional to 1971 census information.

^{2/}

Scenario 1. Demand generated by per-capita consumption estimated for 1970-72. Statistics Canada Cat. 32-226.

Scenario 2. Demand generated by per-capita consumption levels resulting from maximum economic growth.

Scenario 3. Demand generated by per-capita consumption levels as recommended in the Canada Food Guide. (How to Plan Meals for Your Family, Nutrition Division, Dept. of National Health & Welfare 1970).

FIGURE 1
PRINCIPAL FARM RESOURCES AND CASH FLOWS, CANADA, 1976

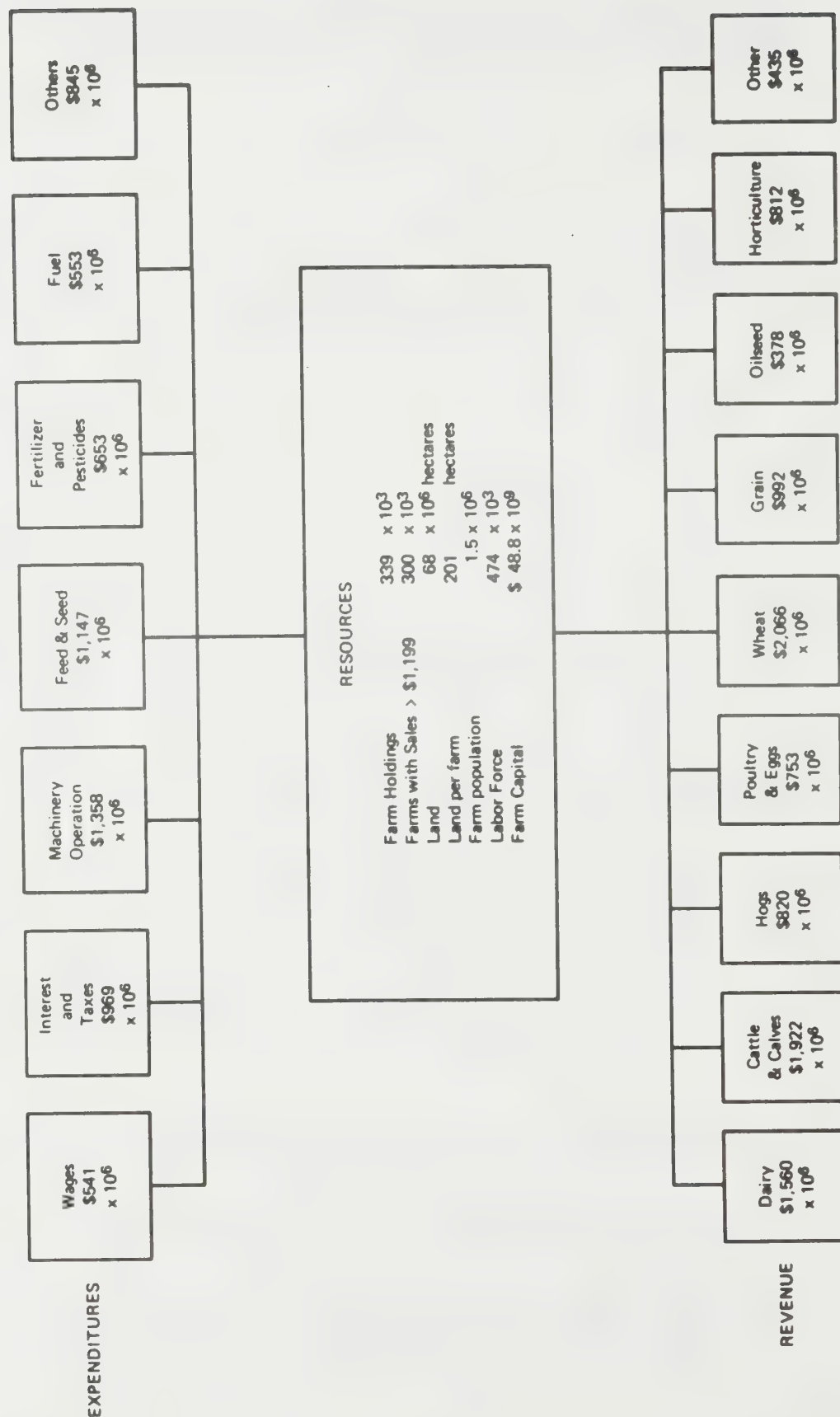


FIGURE 2
EXPORT AND IMPORT VALUES OF AGRICULTURAL COMMODITIES
COMPARED TO FARM CASH VALUE OF CANADIAN PRODUCTION, 1975

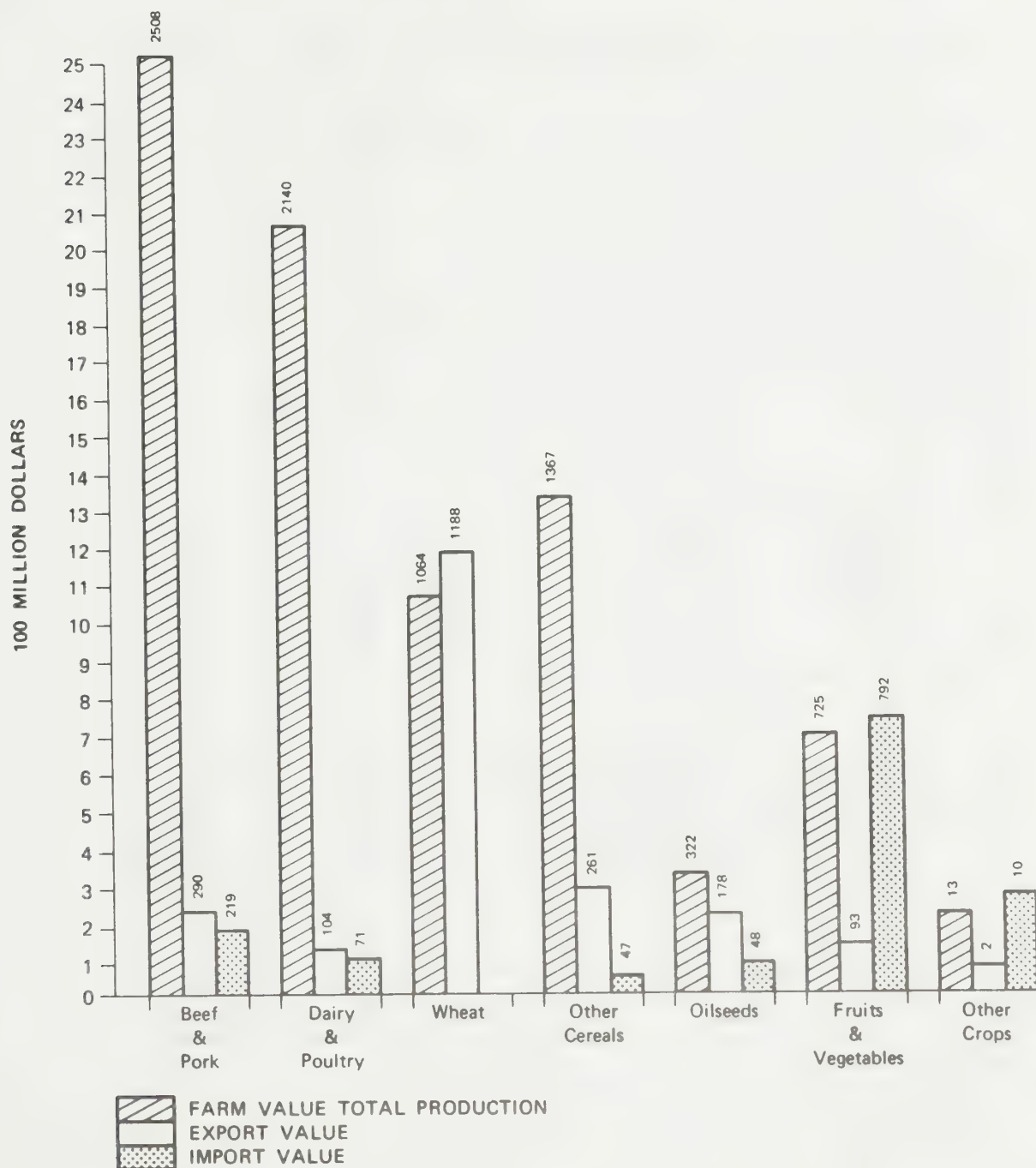
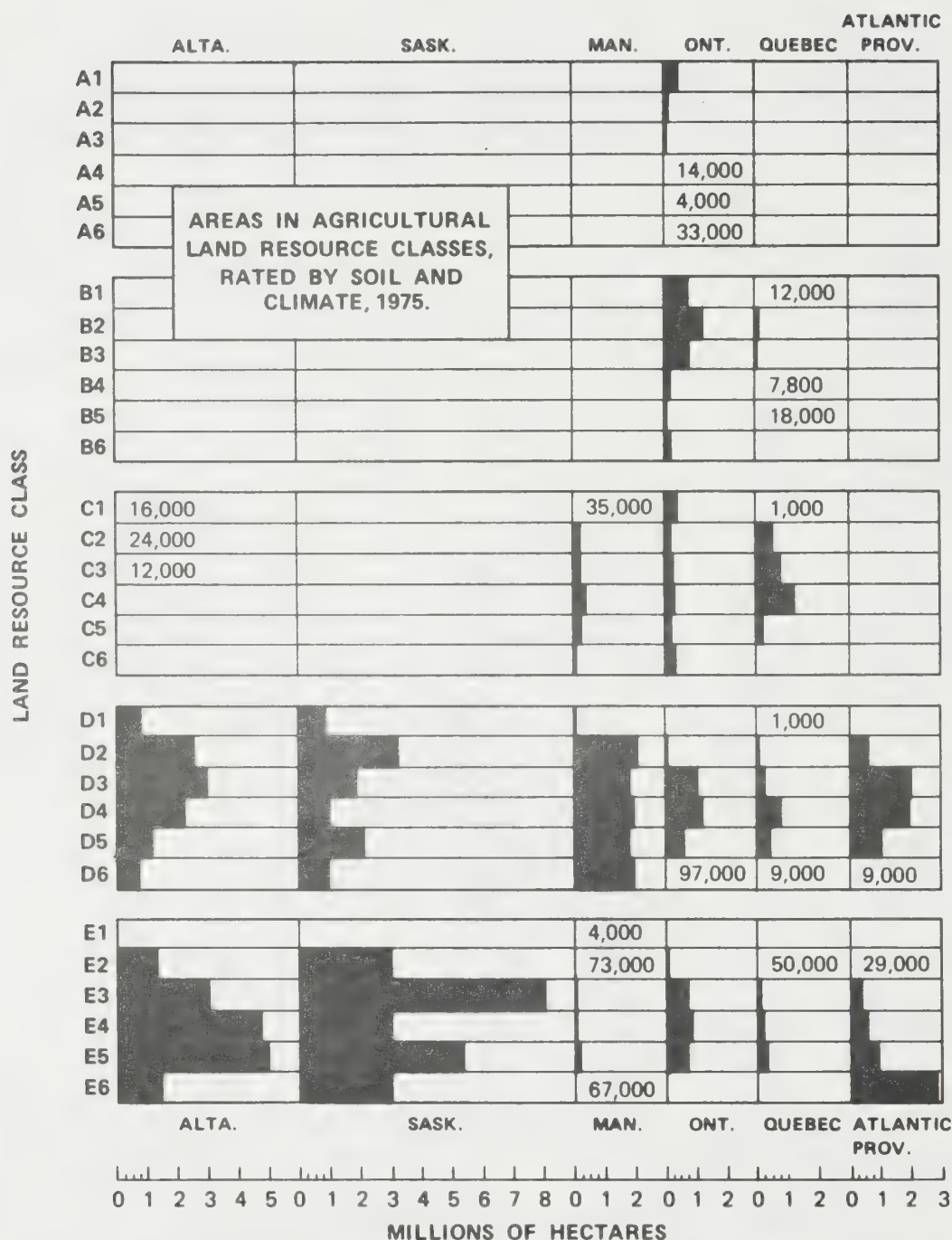


FIGURE 3



The five climatic zones (A to E) in order of declining quality are based on William's agroclimatic resource index ACRI, which takes into account frost-free season, heat accumulation and moisture deficiencies. The soil capability classes rate soils as follows:

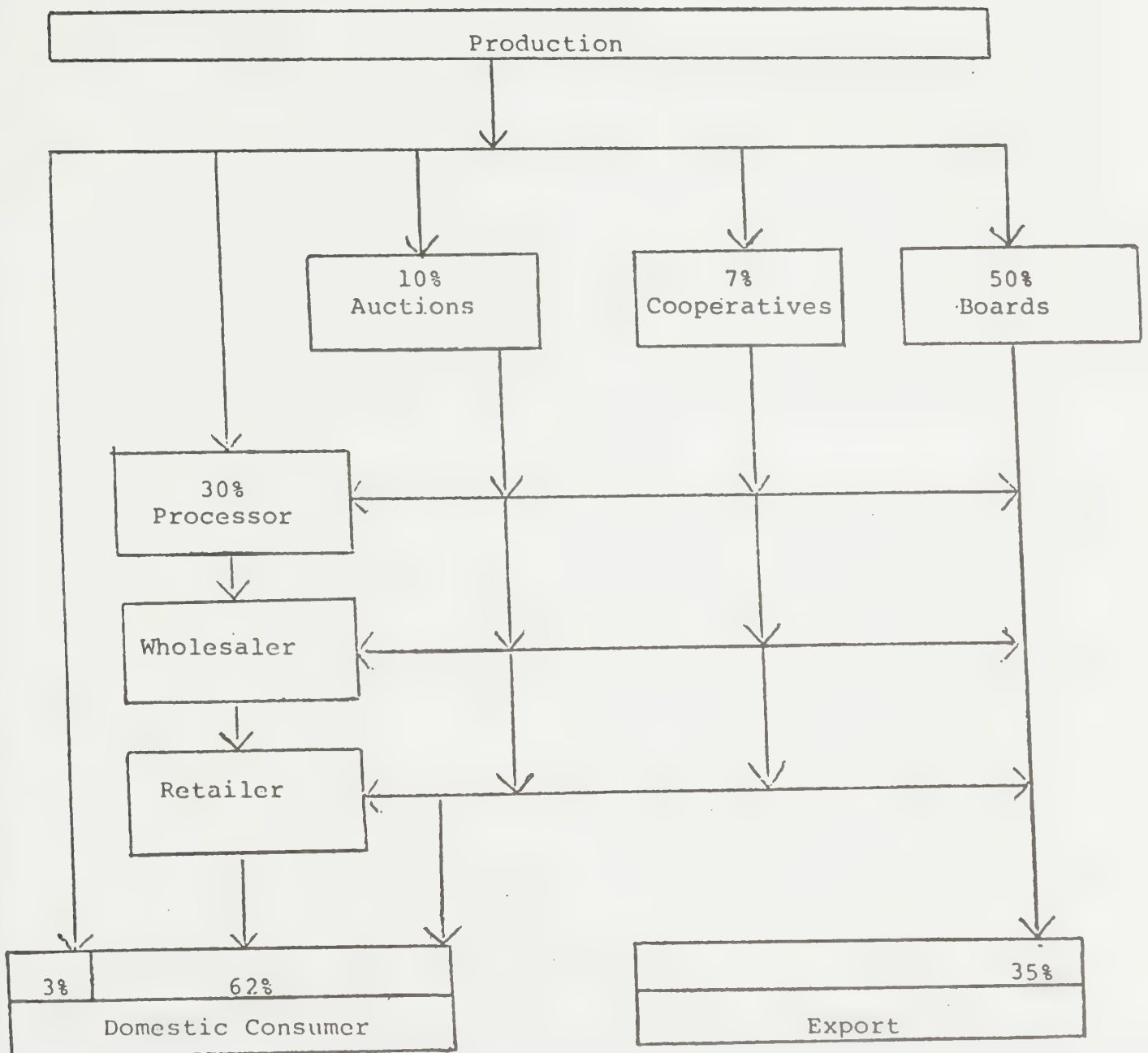
1. No limitations for general field crops.
2. Moderate limitations that restrict range of crops or require moderate conservation practices.
3. Moderately severe limitations.
4. Severe limitations; suitable for only a few crops, or else the yield for a range of crops is low, or high risk of crop failure.
5. Perennial forage at best, but improvements feasible.
6. Perennial forage, improvements not feasible.

Data is not yet available for British Columbia; estimates for B.C. are 600,000 ha. in classes 1 and 2, 1.4 million ha. in class 3, and 2.6 million in class 4, in various climatic zones.

Typifying areas

- CLIMATE A Essex, Kent counties, Ontario only.
- CLIMATE B S.W. Ontario, shores of Lake Ontario and Georgian Bay. West part of Montreal Plain.
- CLIMATE C Immediate environs of Edmonton, Brandon, Morden. Manitoba Plain N. of Winnipeg and Portage. Central Ontario, Ottawa Valley, Montoulin, Central St. Lawrence Lowlands of Quebec.
- CLIMATE D In Alta: part of Peace R., W. of Edmonton to Lloydminster, Camrose, Stettler, Drumheller, Calgary, Lethbridge, Medicine Hat and Cardston. In Sask. Pr. Albert, Melfort, Saskatoon, Wynyard, Weyburn and Estevan. Most of Manitoba Plain, Interlake area. Most of Eastern Ontario. Northern Clay Belt, Lac St. Jean, Appalachian Valleys, Riv. du Loup, Southern N.B., N.S. and P.E.I.
- CLIMATE E In Alta: Rocky Mt. House, Edson, Barrhead, rest of Peace R. W. Sask. Meadow L., Battleford, Rosetown, Maple Creek, S. Current, Moose J., Regina, Tisdale-Hudson Bay area. Manitoba: Riding and Duck Mtns, Algonquin Pk. in Ontario. Quebec: Abitibi, Laurentides, Gaspé, North N.B. Highlands and Nfld.

Figure 4. The Canadian Agricultural Marketing System



The Farm Input Supply System

Farm Machinery - Investment in farm machinery in Canada amounts to \$6.4 billion which is 15 percent of total farm capital. Current annual sales of farm machinery are over \$1.0 billion but these are highly variable depending on the level of farm income. Over 80 percent of the farm machinery sold in Canada is imported, largely from the United States. The industry is dominated by a few, multi-national firms but small firms have been successful in producing specialized products or supplying components to the larger firms. Canadian production, principally combine - harvesters, amounts to 10 percent of the North American output. Retail distribution is largely through 2,000 franchised dealers in Canada.

Fertilizers - Canadian farmers use over 1.2 million tonnes annually of the three primary fertilizer nutrients, nitrogen, phosphorous and potassium. Total expenditures by farmers for fertilizers and limestone amounted to approximately \$485 million in 1975 but sales vary considerably from year to year depending primarily on the level of world grain prices. Most of the fertilizers sold are manufactured in Canada. A large amount of phosphate rock is imported, this is more than offset by exports since more than 80 percent of the total volume of Canadian output of fertilizers containing the three primary nutrients is exported, largely to the United States. The manufacturing sector consists of a few large firms, mostly foreign-owned, and several farmer-owned cooperatives. The retail distribution system includes about 230 bulk blending plants, mostly located in Eastern Canada. In Western Canada, distribution is largely through local representatives of the manufacturers, the Wheat Pools and other farmers' cooperatives.

Chemicals - The consumption of agricultural chemicals increased rapidly in the years 1950 to 1975 and now represents an annual expenditure by farmers of over \$155 million. This amount is still, however, a small percentage of total farm operating expenses.

The Canadian pesticide industry is largely foreign owned and mostly a formulation one since a large part of the basic ingredients are imported. Imports of agricultural chemicals enter duty free and in 1975 totalled over \$110 million, while exports were less than \$17 million. While a few formulators are dominant, the industry nevertheless is highly competitive because the products of different companies compete for the same use. Retail distribution is carried out by many of the same agencies which handle fertilizers, feeds and other farm supplies.

It has been suggested that pesticides offer the best short-run solution for increasing world agricultural output because of the high benefit-cost ratio, provided that they are used in a manner not detrimental to the environment.

Seed - Canadian farmers use seed obtained both from their own production and purchased from specialized seed producers. The trend, however, is toward more purchased seed and this expenditure by farmers now amounts to \$200 million a year. Canada produces seeds of most cool-climate crops for domestic use and export, especially cereals, corn, oilseeds and forages, and some vegetable seeds. The value of seed exports in recent years has been about \$20 million annually.

Canada has a relatively large plant breeding program, mostly publicly financed, but private plant breeders are becoming more important. The

distribution system for commercial seed (pedigreed and non-pedigreed) in the domestic market includes private seed companies, integrated seed grower-processors, and farmer's cooperatives.

Feeds - Canadian farmers spend over \$1.0 billion annually on commercial feeds and this outlay represents one fifth of total farm operating expenses. Feed costs account for 80 percent or more of the operating costs of specialized hog and poultry producers. The feed industry employs about 15,000 people and is highly competitive business.

Petroleum - Canadian farmers spent about \$464 million on petroleum products in 1975 although agriculture is a relatively small user of fossil fuels in the economy as a whole. Total direct and indirect use on farms accounts for about 4.5 percent of total Canadian consumption of petroleum for all purposes, but this accounts for only about one fifth of the total energy required to produce, process and market food. In the short run, it would be difficult to effect significant fuel conservation measures in farming but, in the longer run, some savings may be possible. Alternative viable sources of energy are also limited. For these reasons, should any fuel allocation plan become necessary, agriculture should rate as a high priority user.

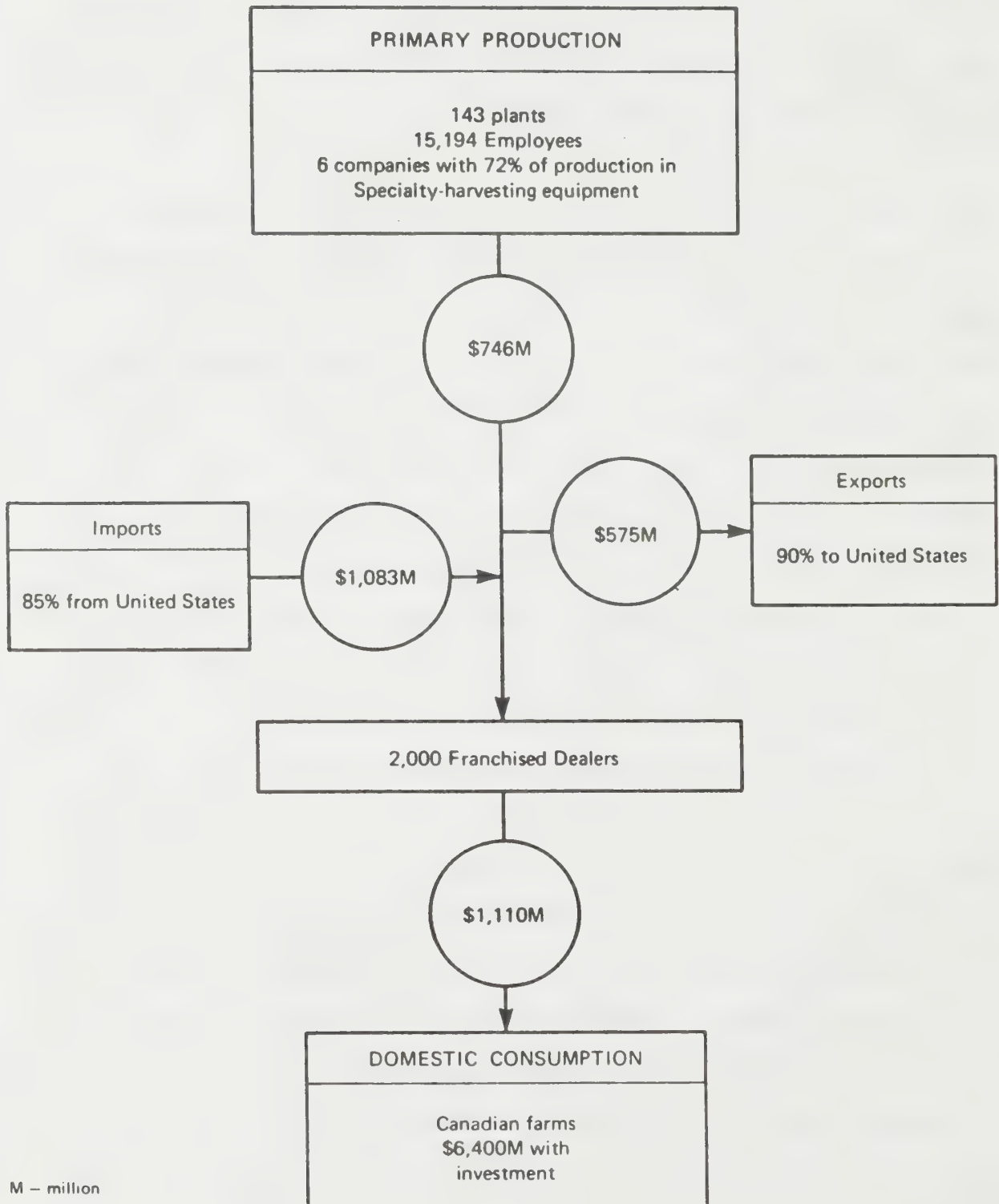
Finance - Since 1951, Canadian farmers have shifted considerably from equity to debt financing, although farmers still hold about 80 percent equity in total farm assets. In 1975, debts as a percentage of total farm assets amounted to 19 percent compared with 9 percent in 1951. Relative costs of

debt servicing have increased in about the same proportion, from five percent of total farm operating expenses to 10.5 percent during the period. The banks have traditionally been the main source of short- and intermediate-term credit for farmers, and the Federal Government, through the Farm Credit Corporation, has been the major source of long-term credit, supplying about 70 percent of the total long-term credit.

Labor - The farm labor force consists of 474,000 persons, approximately 5 percent of the total Canadian labor force. In 1951, the farm labor force numbered 939 thousand persons and constituted 18 percent of the Canadian total. The labor force is largely either self-employed or family labor since hired workers constitute only about 23 percent of the total and more than 50 percent of all farms were operated without any hired labor. The number of hired laborers has remained about the same (100,000 persons) since 1951 while the self-employed and family portion of the labor force has declined by 56 percent - from 839 to 370 thousand. The hired farm labor wage bill in 1975 amounted to \$506 million which was nine percent of farm operating costs as compared with 13 percent in 1950.

An estimated 70 percent of hired labor is employed full time. This still leaves a large proportion of farm labor which is employed seasonally. This along with the fact that levels of compensation and fringe benefits are generally less than in other industries leads to recruitment problems. Even at competitive wages, farm labor is difficult to obtain and retain because factors such as isolated job locations and limited job security feature much of hired farm employment. Governments and farmers' organizations are working together to develop better employment policies but hired farm worker representatives are only marginally involved in the process.

FIGURE 5.1
FARM MACHINERY INDUSTRY, CANADA, 1975



M – million

FIGURE 5.2
FERTILIZER MANUFACTURING INDUSTRY, CANADA, 1975

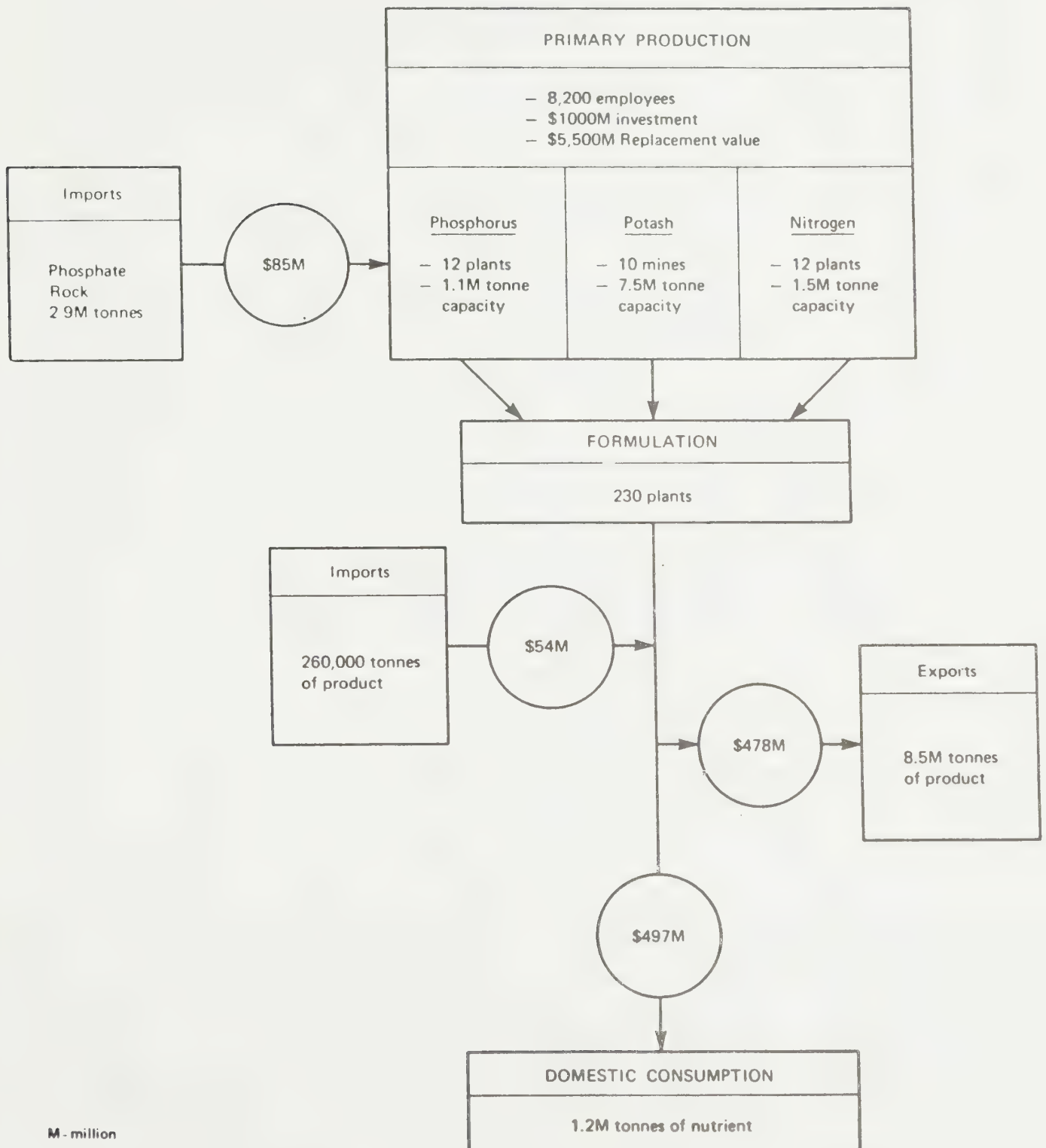


FIGURE 5.3
AGRICULTURAL CHEMICAL INDUSTRY – 1975

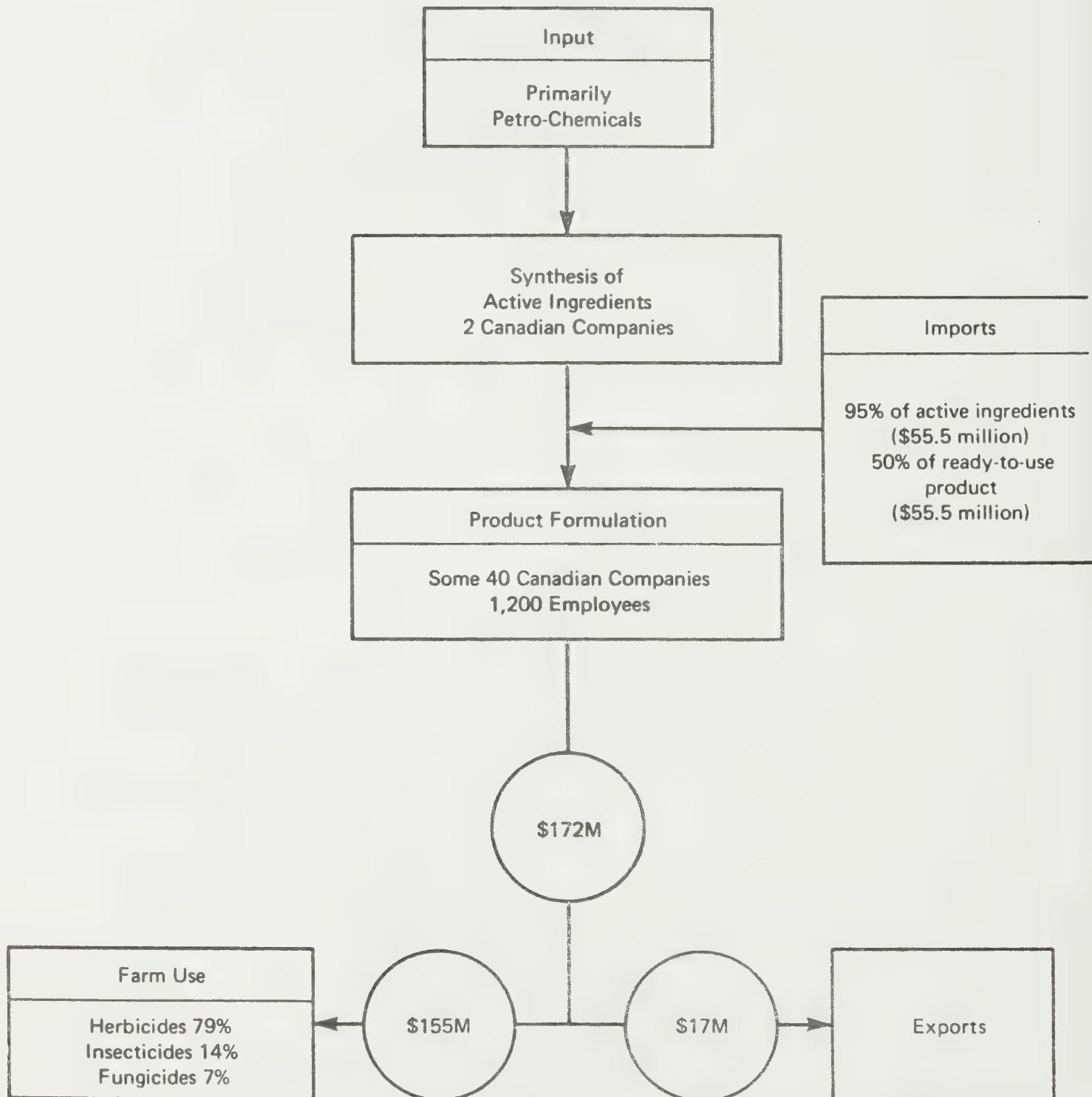
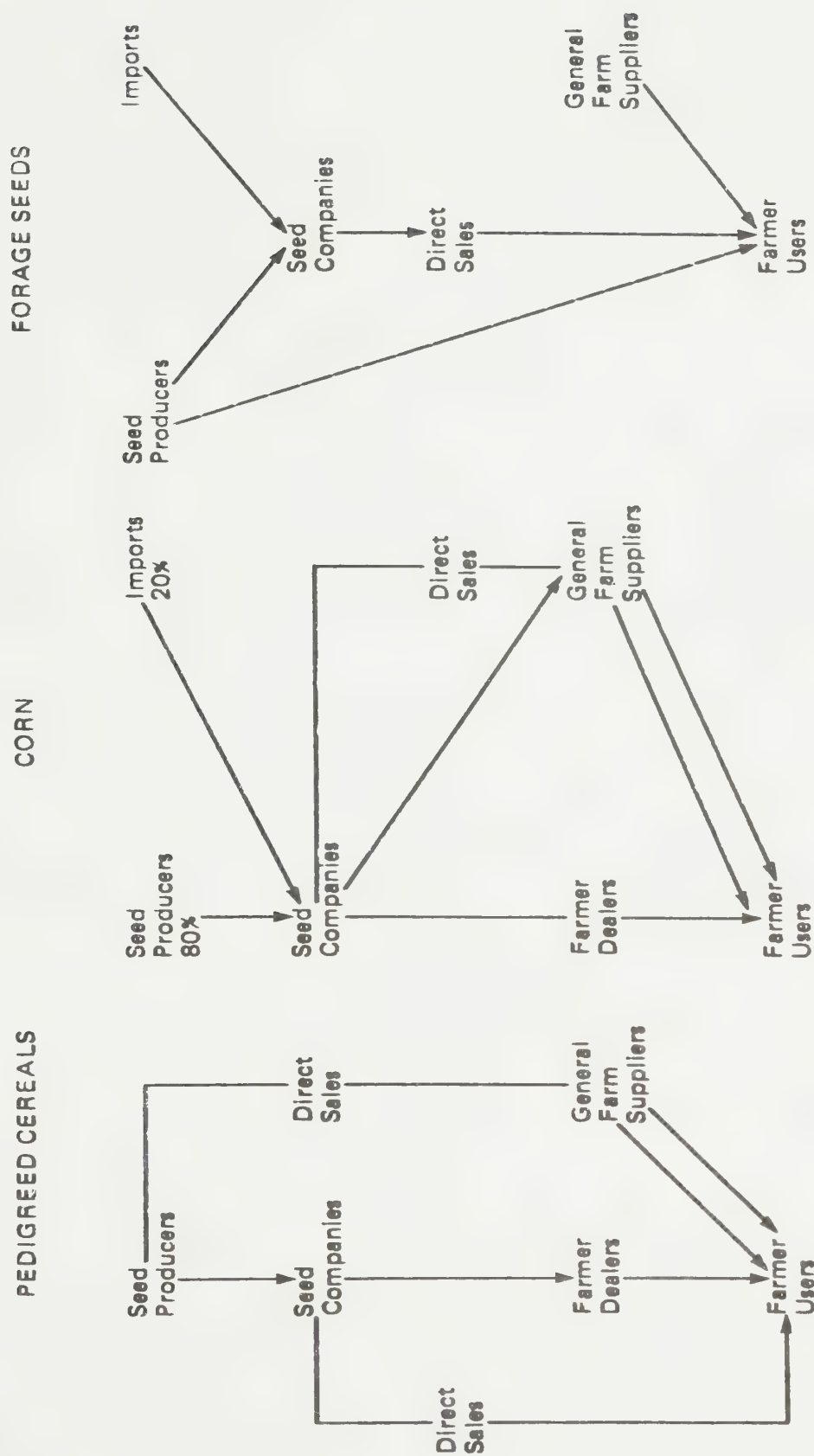


FIGURE 5.4 CANADIAN SEED DISTRIBUTION SYSTEM, 1975

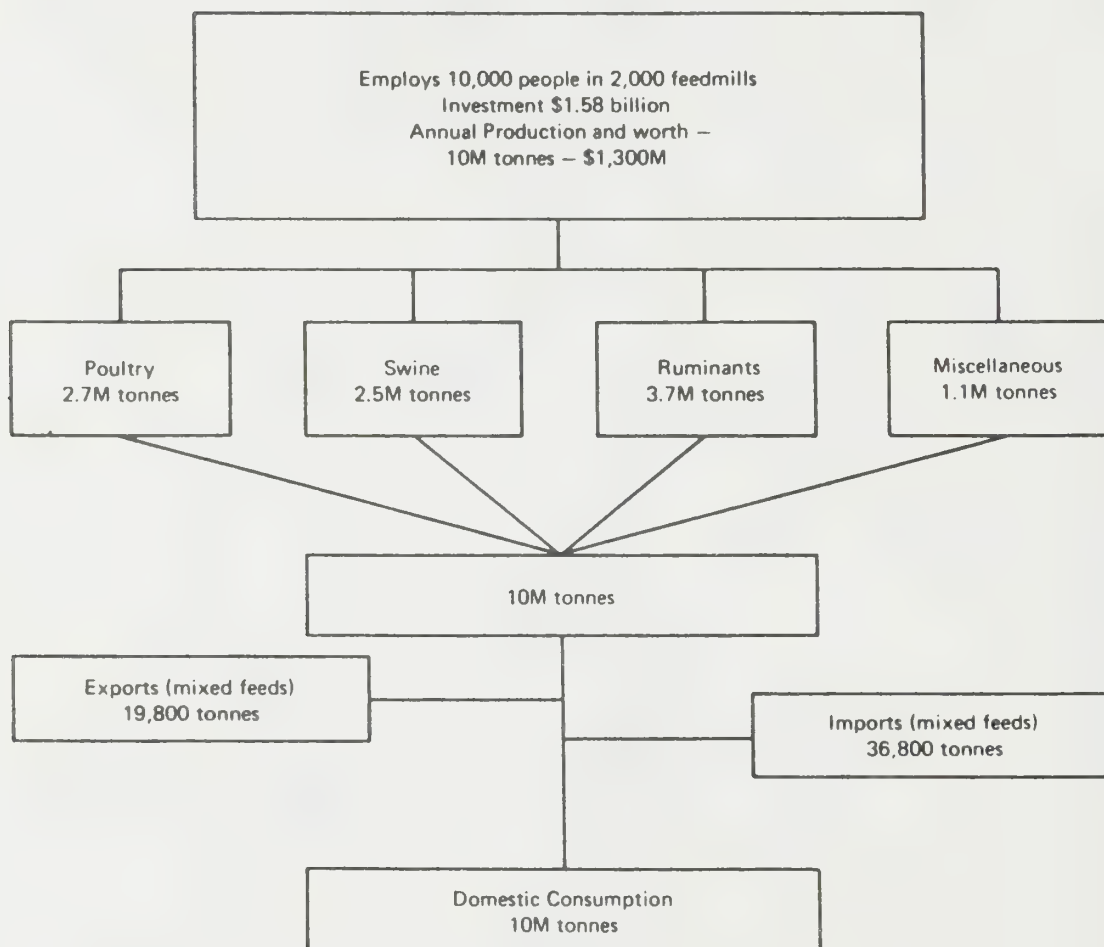


Many sales are made by growers.

All sales are through companies.

Most sales are made through companies.

FIGURE 5.5
PRIMARY PRODUCTION (MIXED FEEDS)



M – million

FIGURE 5.6
CANADIAN FARM FINANCE, 1971 & 1975

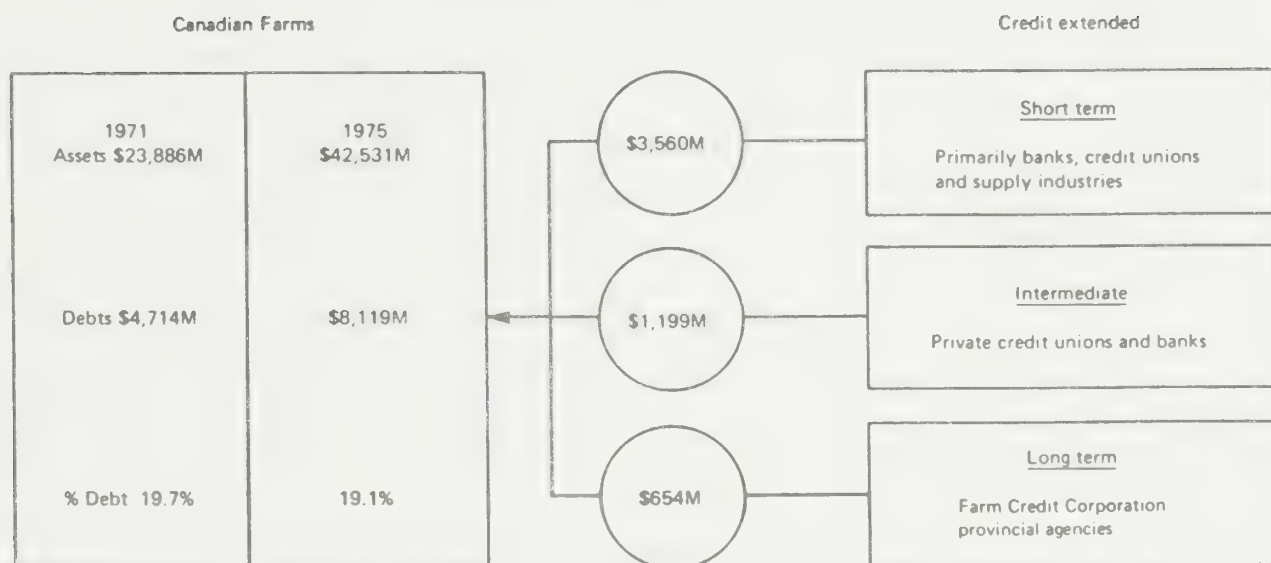
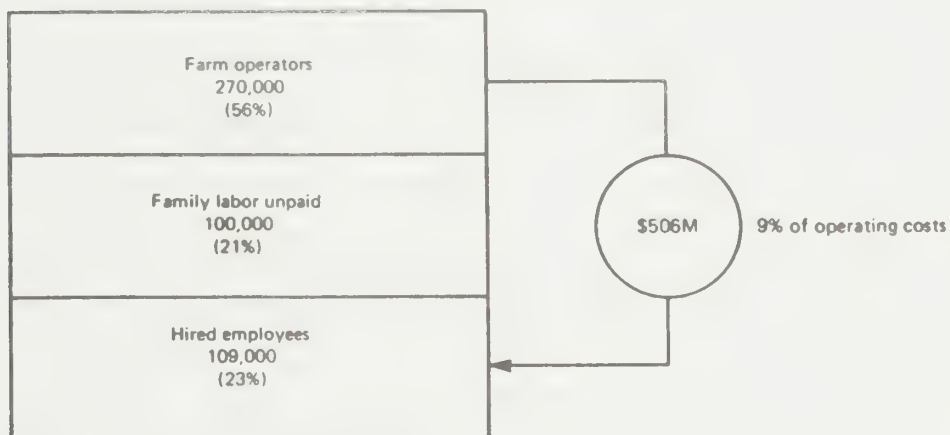


FIGURE 5.7 CANADIAN FARM LABOR SUPPLY, 1975



Canadian Food Utilization and Consumption

Total food consumption per capita has remained nearly stable since 1961 and per-capita consumption is expected to continue at this level; in 1975, Canadians spent 18.3 percent of the disposable income on food compared with 21.6 percent in 1961. Among foods, the average consumer spends proportionately less on meat, poultry, fruits and vegetables, dairy and cereal products, and more on fish, fats and oils, frozen foods and food away from home than in 1962. Consumers in higher income groups spend more on red meat and frozen foods, and an increasing portion of their food budgets on food served outside the home. In 1974, food purchases away from home accounted for 25 percent of consumers' food expenditures as shown in the attached chart.

If real income per capita continues to increase, the content of the food basket likely would change to greater amounts of red meats except pork, of fruits and vegetables, and of fats and oils except lard; the per-capita consumption of fish and eggs would remain relatively unchanged and that of dairy products, cereals and sugar would likely decrease.

The per-capita energy available from food consumption (3000 kcal./day) in Canada is considered to be too high in view of the increasingly sedentary lifestyle of Canadians. Obesity and coronary and heart disease are the most serious diet-related health problems; consequently, decreased consumption of calories, while maintaining proper nutrition, as well as other healthful practices, such as exercise and avoidance of stress, should be a concern of Canadians. Also foods may need to be additionally fortified to restore nutrients lost in processing.

Institutional Coordination and Liaison

Because of the joint federal-provincial responsibility for agriculture provided for in the B.N.A., Act both Agriculture Canada and a number of other federal bodies as well as the provincial departments and agencies administer programs in the field of agriculture. The eleven governments generally cooperate and consult to work out mutually acceptable policies and programs. Federal expenditures in agriculture have generally been about twice that of provincial expenditures. In 1973-74, federal and provincial expenditures for agriculture totalled about \$1.0 billion.

The Canadian Agricultural Services Coordination Committee (CASCC) established in 1932 is the federal-provincial coordinating mechanism for agricultural services. At the annual meeting, CASCC considers the recommendations of its regional counterparts, of its special committees and of the Canada Agricultural Research Council; where appropriate, it recommends action by one or more of the agencies represented by its 36 members. Other federal-provincial coordination mechanisms include the various ministerial conferences held annually, Agriculture Canada's Food Systems Branch and the annual Outlook Conference. The large number of associations representing interest groups play a major role in coordinating Canada's agriculture and food system. These groups, in 1975, included 1750 cooperatives, 109 marketing boards or agencies, three major farm interest groups and numerous commodity associations and trade associations involved in advocating the particular needs of their sector of the food and agriculture system.

Demand and Supply Management

Background - Canadian farm policy developments over the post-World War II period may only be understood in light of the economic conditions of the period. The dynamic nature of Canadian agriculture is revealed by the fact that improved land increased by only 8 percent over the period 1951-71, while total production increased by over 50 percent. Yield increases were accompanied by large-scale substitution of fertilizer, machinery and other purchased inputs for labour and land.

The decade of the 1960's was characterized by a cost-price squeeze where prices received by farmers increased by 16 percent while the cost of purchased inputs rose by more than twice that rate. On average, the agricultural labor force was working for very low returns. Markets were characterized by very low price and income elasticities of demand and the expansion of exports was hampered by the restrictive policies of the European Economic Community and the aggressive surplus disposal programs of the United States. Agricultural policy development during the 1960's in Canada was low-keyed compared with those policies developed in the United States and the EEC. There was continuing price support for the dairy industry and modest support for a few commodities under the Agricultural Stabilization Act. The institutional structure was far more important to agriculture than direct intervention to support farm incomes. For example, grain marketing was dominated by the Canadian Wheat Board, the trade was regulated by the Canadian Grain Commission, federal policy supported provincially organized producer-marketing boards and a well developed agricultural credit program was in operation.

The inflationary conditions of the 1970's contrast sharply with the economic situation of the 1960's. One of the most serious challenges to policy development over this next decade is to develop a combination of policies to protect the income position of farm families facing intolerably high costs.

Demand Management - A variety of programs have been used to influence the demand for agricultural commodities. These have included programs which may be divided into three broad categories; domestic consumption subsidies, sales promotion and multiple-price plans.

(a) Domestic Consumption Subsidies take the form of government payments designed to lower the cost to domestic consumers of specified products. The payments may be paid to consumers directly, or indirectly through producers, wholesalers or retailers. In theory, the subsidy allows an expansion in effective consumer demand for the product. In the fall of 1973, the Federal Government introduced a consumer subsidy on fluid milk (5 cents a quart), and on instant skim milk powder in consumer-sized packages (20 cents per pound, equal to 5 cents per quart reconstituted). The fluid subsidy continued for one year and was then phased out over a brief period. The skim milk powder subsidy is still in effect and the per pound subsidy has increased from 20 to 34 cents. Over the four fiscal years 1973-74 to 1976-77 over \$40 million has been paid to skim milk powder processors in subsidy payments by the Federal Government.

Canadian experience in consumption subsidies has been very limited. The United States, by comparison, has employed a wide range of programs including food stamp plans, school lunch, breakfast and special milk programs and assistance programs to institutions. These have met varying degrees of success. The EEC has general food subsidy programs as well as assistance for special disadvantaged groups.

(b) Sales Promotion - In the late 1960's the Federal Government began an expansion of its program for foreign market development in order to regain lost wheat markets and win new outlets for barley and rapeseed. Gradually, programs were extended for other products. The federal and provincial governments and farmer organizations undertook sales promotion of tobacco, dairy products, fruits, vegetables, hogs and poultry.

The Department of Industry, Trade and Commerce handles an estimated 95 percent of the Federal Government's expenditures on market development for agricultural commodities. Its role in the promotion of agricultural exports was expanded in 1972 when it was charged with the administration of the Market Development Fund for Agricultural Products. This fund provides assistance to institutions and to private firms to expand sales and open new markets.

Provincial government programs for a variety of agricultural products are operated by the Alberta Export Agency, the Manitoba Export Corporation, the Ontario Food Council and the British Columbia Fruit Board.

In the United States, private companies as well as the Federal Government, have engaged in export sales promotion. The relative success in sales promotion by that country shows what achievements are possible. This success has largely been the result of private initiatives including the more aggressive approach of U.S. management, the higher state of development of American food technology and the economies of scale enjoyed by the industry.

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(c) Multiple-Pricing - Two-price or multiple-price plans are a means of maximizing producer revenues through export disposal programs or domestic marketing plans. To be successful, segregation of markets is essential and the price elasticity of demand must be different in each of the markets.

An example of a two-price plan is the Federal sales policy for wheat. Sales in the domestic market are subject to a fixed price regardless of the international price for wheat. If the international price rises above this price, the Government pays the difference up to a specified maximum, to the Canadian Wheat Board. This plan is designed both to keep down the cost of wheat products to Canadian consumers and to provide a floor price in the domestic market for producers.

Supply Management - Many agricultural markets are characterized by a situation in which production is expanding faster than growth in demand. This results in price and income instability and very pronounced cycles. The purpose of this section is to explore the mechanisms employed in controlling input, output and amounts of produce marketed.

The 1970 LIFT program of the Federal Government is an example of land input restriction in the production of wheat. This program was undertaken because carry-over stocks were high and had a price depressing effect and carrying charges were large. Under the LIFT program, wheat acreage was reduced by half. Its largest impact was on reducing storage costs and financing inventories.

The most popular means of managing supply has been the creation of marketing boards under provincial and Federal legislation. Through such boards, Canadian farmers have gained a measure of the bargaining power long

enjoyed by some groups of organized labour, professionals, and manufacturing and service industries. It is estimated that less than one-half of the more than 100 boards now in operation use some form of restriction on inputs, outputs or sales. Those boards employing restrictions have usually opted for limits on inputs. National marketing agencies have been established for eggs and turkeys under the National Farm Products Marketing Agencies Act. These agencies set provincial production quotas and impose levies to cover the cost of marketing. The objective is to provide stable returns to producers at levels which cover the cost of production. Hence, producer prices are determined by cost of production formulae and quotas established to limit quantities produced.

The Canadian Dairy Commission operates a comprehensive program for manufacturing milk including direct subsidies, prices announced at the beginning of the production period, producer levies to cover the cost of exporting skim milk surpluses and supply management achieved by allocating quotas and controlling imports.

A major problem with marketing boards is that quota values become capitalized and thus become an element in fixed costs. This has been taken by some as a demonstration that some boards have unduly limited output in order to raise prices. Public authorities have a responsibility to insure that quota values are maintained at moderate levels so that flexibility is maintained in these markets and entry of new producers is not restricted.

It must be recognized that marketing boards have also yielded clear and important benefits. Marketing boards have improved market structure, standardized products and improved terms of sale for producers. In addition,

they have contributed to price and income stability through export sales, storage and the use of effective bargaining techniques. The issue for policy making is to accentuate and build upon these constructive aspects of marketing boards.

The goals of supply and demand management have been jointly served through the use of export disposal plans. Export disposal applies to shipments under foreign aid programs and disaster relief and the export of surplus commodities at lower than domestic prices. Canada has supplied food aid for less developed countries since international programs were initiated after World War II. At the World Food Conference in Rome in 1974, Canada pledged an average of one million tonnes of food grains annually for 1975, 1976 and 1977. Canadian food aid and disaster relief programs have been used to a modest extent to accommodate domestic agricultural programs but, unlike in the United States, this accommodation has never been an explicit part of Canadian policy and shipments solely for this purpose have been small compared with those of the Americans.

The most systematic programs to restrict output as a means of improving farm incomes have been those of the United States. These have included acreage set-asides, non-recourse loans and export disposal plans.

Various acreage limitation or set-aside schemes have been used by the United States Government since the 1930's as a means of restricting agricultural output. These have been resorted to in periods characterized by serious surplus accumulation and have met varying degrees of success. Greater emphasis has been placed on price supports employing the Commodity Credit Corporation (CCC) purchase program, than on strict area allotments. A

restriction of land input could be effected by giving access to non-recourse commodity loans dependent on cooperation with an area allotment program. Farmers could take advantage of CCC loans, providing guaranteed floor prices, by using these crops as collateral and placing them in storage. The farmer could later repay the loan and redeem this crop, or keep the loan and transfer title of the crop to the CCC. This program was designed to handle problems of surplus disposal when markets are weak. The American program of foreign food aid and sales at concessional rates has also been a powerful tool for restricting domestic supply in times of surplus, and for increasing the over-all demand for American agricultural commodities. There is a consensus among most observers that all of these farm programs in the United States in the 1950's and 1960's led to net farm incomes ranging from 20 to 50 percent higher than would have been the case in the absence of the programs.

The European Economic Community (EEC) has developed very different agricultural pricing programs in pursuit of policy goals similar to those of Canada and the United States. The Common Agricultural Policy (CAP) of the EEC represents an attempt to integrate nine farm economies of very different characteristics. The most important element is the use of variable levies as the basis for price supports. These are applied to imports from non-member countries so that the EEC captures the difference between the open market, world prices and the generally much higher internal EEC prices. Simultaneously, the CAP provides for strong intervention in the domestic market to resolve income problems of the farm community, and maintenance of the equilibrium between demand and supply in the domestic market. Promotion of exports is also undertaken. Most visibly, this pricing system has caused surplus dairy and grain production. In addition, the CAP, based primarily on price regulations, has not solved problems of income disparity within the agricultural sector,

or between the agricultural and other sectors. The CAP has been criticized as a costly, ineffective program which imposes a double burden on taxpayers by subsidizing exports while generating high food prices within the Community.

Wheat

Wheat is Canada's dominant field crop. About 98 percent of the 10 to 12 million hectares planted annually is in the Prairie Provinces. In 1975, farmers in these provinces received \$2,448 million from sales of wheat, more than 46 percent of their total farm cash receipts.

The domestic market for wheat is small, and export markets are relied upon to take about 75 percent of the production. Wheat exports comprise about one half the value of all Canadian agricultural exports, and about 6 percent of the value of all export commodities. Domestic use of wheat is mainly by the flour milling industry, which uses about 2.5 million tonnes a year, and by the animal feeding industry which requires a further 2 million tonnes. In addition, relatively small quantities are used by the breakfast food and chemical industries. Canada's flour milling industry has been declining during the past two decades, reflecting the loss of export flour markets. This has been a result of increased milling capacity in former flour importing countries, and as a result of export subsidies by competing exporting countries.

One of the most difficult problems facing the Canadian wheat industry is the wide fluctuation in demand and prices characteristic of the present international wheat market. With the exception of wheat used for domestic

human consumption, for which the price is set under the two-price wheat program, the farmer receives a price for his wheat that is basically established in international markets. The Canadian Wheat Board is the sole marketing agency for wheat grown in Western Canada and entering inter-provincial and export trade. Canada's wheat growers are at a disadvantage relative to their competitors in international wheat markets because of the long distance by rail and boat to their markets. Transportation both within the country and overseas thus is of critical importance.

A comprehensive program of research has provided farmers with the technology that enables large scale grain production. It is only because of the extensive and mechanized nature of Prairie farming that the wheats grown in Canada can compete successfully in the world market.. Continuing growth in the agriculture industry of Western Canada is to a large extent dependent upon Canada's ability to maintain this efficiency and to obtain a steady and expanding share of the world trade in wheat and flour.

Non-Wheat Cereals

Non-wheat cereal grains (barley, oats, corn, mixed grain and rye) as a group are very important Canadian agricultural commodities, with an average annual farm value for the 1970-74 period of \$1.4 billion. The average annual production for this period was 20.5 million tonnes grown from coast to coast on 9.2 million seeded hectares. The land area required for this production is relatively large as these grains are produced as part of a land use rotation. In the prairies, this involves summerfallow as a significant part of the cropping rotation.

The main regions of production are the Prairies and Ontario, including 94 percent of these cereals in the 1970-74 period. The Prairies produced 73 percent of the farm value of production of these cereals from 80 percent of the seeded hectares. The comparative figures for Ontario with 23 and 14 percent respectively. The higher value of production per hectare for Ontario was due to both a higher yield level per hectare and a higher farm value per unit of production.

The main grains in terms of value of production within this group for the 1970-74 period were barley and oats. In recent years the acreage and production of corn has been increasing significantly in Ontario, the main corn producing area.

Variation from year to year in yield and prices in the Prairie Provinces results in a large fluctuation in returns to the farmer. The Prairies have a surplus of these feed grains, while the Maritimes, Québec and British Columbia are deficit areas.

The four secondary industries of brewing, distilling, feed manufacturing and flour and breakfast cereal have shown an upward trend in production. Value added in 1974 was \$1.2 billion.

Exports of barley represent Canada's major non-wheat cereal grain export, and during the 1968-69 to 1972-73 period accounted for 28.4 percent of the total world exports of barley. United States corn occupies a dominant place in international markets of non-wheat cereal grains, and Canada is a net importer of this crop in spite of a rapid increase in production in the last decade.

Oilseed

Oilseed production involves about 2.2 million hectares, of which 90 percent are on the Prairies. Only soybeans are grown commercially east of the lakehead and all their commercial production is in Southwestern Ontario. Canadian flax represents 18.6 percent of world production while Canadian rapeseed accounts for 20.5 percent. Rapeseed, sunflower and flax production satisfies domestic markets for seed, oil and meal; but soybean production meets only 50 percent of Canadian needs. Oilseed crops return to the producer about \$360,000,000.

Oilseeds are crushed at 10 plants, the total capacity of which is 1.75 million tonnes per 250-day year. However, only about 60 percent of this capacity is used regularly. Four of the seed crushers also refine the oil, and 5 other companies only refine oil. Canada has about 16 major manufacturers of oil-containing foods. The Canadian oilseed crushing industry represents a capital investment of about \$120 million and employs about 650 people. Domestically crushed vegetable oil has reduced markedly Canada's dependence on imported seed or oil, while the oilseed meal produced as a by-product has become a source of protein for the Canadian livestock industry.

Canadian oilseed exports, about \$280 million, are more than 4 times the value of imports. Oilseeds are traded on the open market with prices determined internationally on the basis of supply and demand. Our major exports are rapeseed and flaxseed and our major imports are soybeans and soybean oil and meal. Over 50 percent of Canadian oilseeds are exported and comprise approximately 11 percent of Canada's agricultural export trade.

Oilseed production has increased markedly in the past 20 years; sunflower, soybeans and flax have enjoyed a 3-fold increase in area and rapeseed a 16-fold increase. The average unit yield has increased by 14-40 percent.

Plant breeding has produced rapeseed cultivars low in both erucic acid and glucosinolates and of lower hull content, as well as soybeans that mature and yield well in cooler regions. Research to reduce crop losses from insect and disease attack, competition from weeds, climatic limitations continues to improve the competitive position of oilseeds in relation to other crops.

Forages

Forages are an essential part of Canadian livestock production, providing 70 percent of the diet of cattle, sheep and lambs, at a relatively low cost. Improved pastures represent about 40 percent of the cultivated forage land in Canada, or just over 4 million hectares. Census statistics show that since 1950 there has been a relative shift of this area from Eastern Canada to Western Canada. Unimproved pasture represents a significantly larger area but in most cases has very low productivity.

Tame hay production occupies 5 million hectares and is the main source of forage for livestock. A steady increase in area and improved cultural practices have made today's pastures and tame hay production a sound forage basis for the beef industry.

Ontario is the main corn silage producing area although there has recently been some expansion of production in Western Canada and Québec. Oats for green feed or silage help to make up the roughage requirements of many farms.

Forage production has undergone extensive changes in recent years because of new handling, processing and storage equipment. In many cases, this has allowed the harvesting to become a one-man operation. Research has been an important factor in the forage advances, and new cultivars specific to various regions of Canada have reduced the adverse effects of diseases and winterkill. Dehydrated or processed forage production has increased dramatically since 1970. This facilitates storage, transportation, exporting and mechanized feeding of an otherwise bulky commodity.

Seed production is a vital part of the forage industry; however, it has decreased in the last 15 years, making us more dependent on imported seed.

Horticulture

The horticulture industry in Canada involves a domestic production of \$725 million plus an imported quantity of \$535 million fresh and \$257 million processed products, countered only by the limited exports of \$56 million fresh and \$37 million processed products. Over one-quarter of the fresh production is processed to some degree before sale to the consumer, with a value added figure of over \$500 million. In this, some 245 major processing plants employ 19,200 workers.

The value of fresh and processed horticultural products produced or handled in Canada thus reaches a total of \$2,089,000,000. Nearly 312,000 hectares are devoted to horticultural production with about 53,000 growers and a total of 210,279 persons employed in the operation.

Horticultural products comprise 40-45 percent of the weight of food consumed by Canadians, and are particularly important as sources of vitamins (especially A and C) and minor elements. They also add much flavor to the diet and aesthetic value to home and work environments. Horticultural production is most important in Ontario with approximately one-half of the total, Québec and British Columbia share equally a third, and the Atlantic Provinces and the Prairies produce the remainder.

Of the fruit production, apples comprise one-half the total acreage. Among the vegetable crops, potatoes hold a similar position. Commercial production of winter-tender fruits (peaches, cherries, apricots, grapes) is confined to the Niagara Peninsula and Essex County of Ontario and the Okanagan Valley of British Columbia.

Seed potato production is centered in New Brunswick and Prince Edward Island, which are the source of most of the seed tubers exported. Table stock potatoes are produced in all provinces.

Field production of other vegetables involves processing crops (tomatoes, corn, peas, beans, etc.) grown mainly on mineral soils and fresh market crop (carrots, lettuce, celery, cole crops) grown mainly on organic soils, primarily in restricted areas of B.C., Ontario and Québec.

Greenhouse production of vegetables and flowers involves 800 acres, with the greatest concentration in southwestern Ontario.

There is a significant trend in the whole industry towards vertical integration, and the processing industry shows a marked trend towards fewer plants with larger individual capacity. While exports are of minor importance, the volume of imports of processed products, especially fruit, has increased dramatically in the last decade.

Other Crops

Other crops contributed about \$235 million net value to the Canadian economy, with a domestic production of \$275 million in raw product and an imported value of \$99 million in combined raw and manufactured items, while exports amounted to \$58 million all over the period 1950-1974. A total area of 238,795 hectares are devoted to the production of other crops, with tobacco and dried beans being the most important cash crops in Ontario while mustard, dry peas and sugar beets are important on the Prairies.

Tobacco sales in all forms at the retail level generate about \$500 to \$750 million in federal revenue through taxation plus an additional \$200 to \$300 million in provincial sales tax revenue. Tobacco production on 44,819 hectares provides about 20 to 35,000 seasonal jobs during the harvesting period in August and September each year.

Import of raw cane sugar is the largest import item, 89 percent, averaging an annual cost of \$89 million (and higher in high price situations - \$505 million in 1975). These sugar imports supply about 90 percent of our annual domestic disappearance of 44 kilograms per capita. In exports tobacco is the most important item, 61 percent of the total, valued at \$35.4 million during the 1950-1974 period, and averaging \$3,381 per tonne shipped.

Canada produces two-thirds of the limited world supply of maple products. Commercial production of \$12,481,000 value is confined to the southeastern regions of Canada. Attempts are being made to expand the use of pure maple products.

Dairy Products

Dairying is one of the most important agricultural and food industries in Canada, representing 19 percent of total farm income, about \$1.9 billion, in 1975, provided to over 80,000 producers. Production is more or less distinctly divided into two sectors, fluid milk and manufacturing milk. The former is generally characterised by a more intensive production procedure than the latter. Capital investment in dairy production has become a major consideration, having risen from \$1720 per cow in 1970 to \$4400 in 1975.

Forage provides an important base for dairy production, much of it on Class 3 and 4 land. Grain and supplements are used for more intensive production but these still represent a relatively small part of total feed consumption.

Dairying is highly regionally oriented, on the same pattern as the human population. About 75 percent of the milk is produced in Ontario and Québec. The dairy herd also contributes significantly to the domestic meat supply (about 25 percent) in terms of veal, manufacturing beef and finished beef. There remains an unexploited potential for increased beef production from male dairy calves.

The dairy sector contributes in a major way to industrial development. Dairy products shipped from processing plants were valued at \$2.2 billion in 1974. Milk is marketed by producers on the basis of quotas and support prices are maintained on butter, cheese and skim milk powder.

Dairy products contribute significantly to good human nutrition. Milk protein represents about 23 percent of average daily protein intake. Less emphasis in terms of relative value is now being placed on the fat component

of milk as opposed to non-fat components. Changes in utilization of milk components have resulted in a significant surplus of skim milk powder. One of these changes is the decline in ~~the~~ on-farm use of skim milk.

Substitute products have replaced about one half of the butter demand and much of that for cream but have affected other products relatively little.

Beef

The production and marketing of beef is Canada's most important agricultural industry, contributing 17 percent of farm cash receipts. About 80 percent of the 160,000 cattle producers are located west of Ontario, but the major markets are in Montreal and Toronto. The forage production base of some 22 million hectares is the major resource supporting beef production.

About 70 percent of the meat processed in Canada is beef. The meat packing industry in total employs over 32,000 people. Annual value of its beef shipments is over \$3.2 billion. Per-capita consumption of beef increased from 23.1 kilograms in 1950 to 46.5 in 1975. Beef is very significant in Canadian diets.

Beef is marketed domestically on an open-market basis, with few restrictions. Canada's international trade in beef is mostly with the United States. In recent years, we have had an overall negative trade balance though a positive trade balance is maintained in feeder cattle, hides and tallow.

Production will increase in relation to demand; to improvement and expansion of the forage base; to availability of alternative feeds, such as waste materials; and to the overall economics of production. Given a favorable state of these conditions, beef production could ~~double~~.

Pork

Pork production involves an important segment of the agriculture and food industry. Hogs are produced by over 100,000 farmers, resulting in \$886 million in farm cash receipts and a retail value of the product of over \$1.6 billion in 1975.

Some 7-11 million hogs are raised annually in all parts of Canada, but Ontario, Québec and Alberta are the major producers. The feed grain supply (barley in the west and corn in the east), plus protein supplement, is the basis for the hog industry. This provides an annual market for the equivalent of 2.8 million tonnes of barley and 0.5 million tonnes of soybeans. A high proportion of hogs are raised on home-grown grains.

The pork system depends upon an efficient processing sector, which, in turn, requires a relatively constant supply. Pork is processed to a greater degree than beef. The processing sector provides employment for about 12,000 workers.

Pork production is primarily oriented to the domestic market. A small export trade, mainly with Japan, has been maintained in recent years. A potential for larger exports exists but this requires policies and programs consistent with such objectives.

Hogs are marketed through provincial marketing boards in all provinces except Québec. The United States market for pork has a major influence on the Canadian market.

The opportunities for growth in the pork industry will relate to efficiency and constancy of production, export market developments and alternative opportunities.

Poultry

Poultry meat and egg production represented 6.8 percent of farm cash income, or \$760 million in 1975. The retail value was \$1.1 billion.

Poultry production is distributed across Canada but is largely concentrated in the main areas of human population. Production is dependent on a supply of feed grains and of protein supplements, the latter primarily soybean meal. Slaughtering and processing of poultry products is an essential part of the system. Processing contributes very significantly to the value added, about \$260 million in 1975.

Poultry products are marketed through provincial marketing boards or through national marketing agencies, e.g., eggs and turkey. These boards establish price and control supply through supply management. Consequently, the industry is highly domestic-market orientated. Since it is essentially non-competitive with the United States there are limited export opportunities.

The poultry industry has been noted for its rapid adoption of a high level of technology in production and processing. However, this had been limited somewhat by lack of Canadian ownership.

Sheep

The sheep industry represents a relatively small part of agriculture, providing about \$13.5 million in cash receipts to 14,000 producers in 1975. The industry has declined steadily since before 1950. This decline has occurred despite the profitability of the sheep for some producers. In Eastern Canada, light lamb or 'Easter' lamb commands a relatively high price.

Sheep are produced mainly in Alberta, Ontario, Saskatchewan and Québec. In 1975-76, a total of 287,334 sheep and lambs were slaughtered in inspected processing plants. This figure does not include a relatively large proportion (est. 47 percent) of total lambs slaughtered which are marketed directly to consumers as light lamb and therefore do not appear in the usual statistics.

About 75 percent of our lamb and mutton and 90 percent of our wool requirements are imported, valued at \$44.5 million in 1975. Exports were about \$1.9 million.

The potential for sheep exists in their capability as ruminants to utilize forages, waste materials and by-products, and for improvement in their biological capability. Lamb is an attractive and nutritious meat. Constraints which will affect the future of the industry include its image, its lack of structure, affecting marketing efficiency and the need to develop proficiency among managers in sheep production.

Other Livestock

Goats - Limited interest in goat production has been maintained over the years. Goats are raised primarily for their milk and considered as a specialty product, although the kids produce very satisfactory meat. Goats utilize high fibre diets; milking goats can use similar feed to dairy cows. Otherwise, they can be raised on marginal land with limited housing being needed.

Rabbits - Rabbit production and consumption is of continuing interest to a relatively small sector of the public; since 1965, production has decreased to the point where 36,100 rabbits were slaughtered in inspected plants in 1975. The main demand for rabbit meat is for the ethnic trade; this becomes a specialty market in large urban centers. The industry, due to its small size, has not evolved rapidly in efficiency and in use of technology. Rabbits are fed commercial diets in pellet form with a high proportion of forage content. Thus, despite some obvious advantages in rabbit production as a meat source, in the use of available feedstuffs, the rabbit industry does not appear to have a bright future.

Horses - While the horse population declined markedly in the period 1950-73, interest in horses has increased in recent years, primarily for recreation, as opposed to their previous use as a source of power. Horses are raised in the urban fringe by hobby farmers. Horses are maintained for recreation and for racing. In 1971, there were 353,000 horses on farms in Canada.

Numbers of horses registered have increased markedly since 1951, reflecting interest in riding and recreation and in showing competition. Racetracks represent an area of major economic activity - \$1.1 billion was wagered in 1976.

Besides draft and recreation, horses are used for production of pregnant mare urine (PMU), meat for human consumption and pet and mink food, hides and hair. Exports of horses and horse products totalled \$23.6 million in 1975.

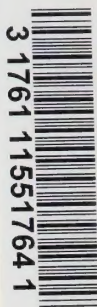
Fur Animals - The demand for furs is met by trapping and hunting wild fur animals and by fur farming. The former continues to be a source of income which is maintained through conservation procedures.

Mink represents 98 percent of the returns from fur farming, the balance being fox and chinchilla.

The mink industry is widespread, most concentrated in Ontario. The industry is influenced by introduction of new color mutants to result in new fashions in furs. In 1975, about one million pelts were produced. Mink require balanced rations, utilizing fish products, meat and meat scraps and cereals. Use of dry feeds is an important step in mink management.

The mink industry in Canada is very sensitive to international competition. While Canada produces top quality mink, the competition in the fur market is intense. This industry is highly dependent on international trade, relying on markets in the United States, but also in Europe. About \$12 million worth of pelts were exported in 1975, but twice as many were imported. Mink and other furs are processed into manufactured goods, such as garments, and the value of this enterprise has been increasing steadily, being \$36.5 million in 1975.





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